THE IRON TRADE REVIEW

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SPOT PRICES

ARE DISAPPEARING FROM PIG IRON MARKET

And Much Easier Conditions Prevail.—New Business in Finished Lines is Also Light.

The first half of the year is closing with an extremely quiet market and no cause for alarm. The present decrease in new business follows naturally the heavy buying movement of recent date.

Spot Prices Disappearing

Spot prices for pig iron are vanishing. Owing to better delivery being given by the furnaces, many of which are now pretty well caught up on their contracts, consumers have little need for spot iron, and prices for spot and third quarter are practically identical. Some sales, especially for the first half of next year, as well as for spot delivery, have been made at lower quotations, notably 3,000 tons of malleable at $20.50 Ohio furnace for the first three months of 1908. In connection with indications of an easier iron market, however, the fact cannot be overlooked that in some cases furnaces are considerably behind on shipments. One extremely large interest, which purchased about 70,000 tons for its first half requirements, finds that it will enter the second half with 12,000 tons still due, or practically one month's supply. The United States Steel Corporation is now operating all but one of its furnaces, but this record was surpassed during the spring, when at one time it was operating 100 per cent of its pig iron capacity. The resale of about 40,000 tons of basic pig contracted for by Milliken Bros., New York, has been nearly completed without disturbing the market.

Crude Steel Is Easier

The crude steel market is distinctly easier. The Cambria Steel Co. has sold about 45,000 tons of billets, prices averaging about $30, and this has relieved the situation very much. Quotations are practically unchanged.

Line Pipe Contract

The most important recent contract for line pipe has been made by the National Tube Co. for 190 miles, to be laid from Roane county, W. Va., to Cincinnati. Manufacturers of merchant pipe are well supplied with orders and promises for delivery are cautiously made. In hoops, bands and cotton ties, very little new business has been developed, but important orders will probably be placed within a few days.

Steel Rail Negotiations

There has been considerable comment in regard to the negotiation between the Pennsylvania railroad and the Carnegie Steel Co. for the manufacture of the Cassatt rail. No orders for 1908 business have been placed at the $33 price, but it seems probable an adjustment will be made. New business in rails is not heavy, but some important inquiries are pending.

Iron and Steel Bars.

Agricultural implement manufacturers are nearly all closed for their requirements for the year beginning July 1. Sales have been very heavy. A large tonnage of steel bars is being used in concrete reinforcement work. Users of bar iron are urging deliveries before the closing of mills for repairs. Owing to the American Sheet & Tin Plate Co. and the Amalgamated Association agreeing to maintain the present wage scale and practically the same working conditions on sheets and tin plates, labor troubles for the coming year are happily averted. Specifications on tin plate are now light, but favorable crop reports are expected to improve conditions. Deliveries on universal plates are now being made by independent concerns in from three to five weeks, and premium prices are not so freely paid. The demand for plates and shapes is good. Railroad orders are prominent in the new business of bridge materials. The carrying out of the contracts of Milliken Bros. will necessitate the purchase of a considerable tonnage of shapes and plates. The most important contract recently placed for cast iron pipe was by the city of Chicago for 2,100 tons.

Coke and Old Material.

An important electric interest has closed for its coke for the year beginning July 14 at $3 per ton at the ovens for standard foundry grades. Large purchases of furnace coke by the Lackawanna Steel Co. have improved conditions temporarily, but the outlook is that the supply of coke will be ample. Quotations on old material are declining sharply at Chicago and in nearly all centers the market is weak.

BREAK OVER CASSATT RAILS IS DENIED.

(Special Correspondence.)

Philadelphia, June 26.—Railroad officials positively deny Pennsylvania story of a break with the Carnegie Steel Co. over the Cassatt rail specifications and say that negotiations are still pending which they believe will terminate satisfactorily.

Some time ago, when the Pennsylvania railroad filed its specifications for steel rails for 1908 requirements in accordance with the design invented by the late President Cassatt, modifying the present section considerably, the Carnegie Steel Co. named $33 as the price for rolling the sections under the new specifications.

THE WEEK IN IRON CENTERS.

PITTSBURG.

Spot Pig Prices Lower.—Large Sale of Billets.—Coke Conditions Improve.

Office of THE IRON TRADE REVIEW,
521 Park Bldg., June 26.

The end of the first half of the year finds the market generally in excellent condition. Pig iron for the time being is inactive and prices for spot deliveries show a slight tendency downward. There is nothing unfavorable in this, however, it being taken simply as a reduction of premium, on account of good furnace shipments. A large part of the high price spot iron sold during the past two months has been in small lots to meet requirements because consumers were not receiving their contract iron. Now that furnace shipments are better, the demand for prompt iron has fallen off and prices are being shaded accordingly. Practically the only steel making pig iron now being sold is resale Milliken Bros. iron which, on account of that concern going into the hands of a receiver must be diverted elsewhere. Some of it has come into Pittsburg, but the tonnage has been small.

The middle of the year brings with it the semi-annual inventory period and in many instances furnaces have been asked to suspend shipments until after July 1, while others, who may need iron are waiting until after the inventory before placing it.

Coke and scrap are still the weakest points in the market. Coke has improved materially during the week under review, but this is largely due to the large purchases of spot coke by the Lackawanna Steel Co., on account of trouble at its own ovens. Aside from its regular contracts, Lackawanna took on 400 cars of furnace coke last week and fairly well cleaned up the spot coke in the region.

In finished lines, structural material continues to improve as far as mill specifications are concerned although there is very little new business being offered the construction companies at this time. The bulk of the agricultural implement interests have closed for their requirements for the year beginning July 1 and a quiet period is anticipated after the recent activities.

Pig Iron.—The only pig iron in any large tonnages being offered for sale is that originally offered to Milliken Bros., on Staten Island, and which, since that concern went into the hands of a receiver, is now being resold. It is understood a large part of it has been taken by the Steel Corporation and shipped to the American Steel & Wire Co., at Worcester, Mass., and the Pencoyd Works, near Philadelphia. The Jones & Laughlin Steel Co. secured a part of this iron on direct purchase and more on a scrap trade deal, giving in part low phosphorus scrap. On account of the better shipments being given by the merchant furnaces, there is less inquiry for spot iron, and this is particularly true on foundry grades, a large part of the spot iron bought recently having been to cover requirements pending receipts of contract iron. Spot foundry iron prices have fallen off as far as some sellers are concerned, from 50 cents to $1 per ton, while one or two of the largest producers are still quoting $26 or higher for prompt northern No. 2 foundry. On account of the decreased demand, Bessemer iron has fallen off 25 cents to 50 cents per ton for spot shipment and the same applies to last half iron. There is really no spot Bessemer on the market, except as noted in the reference to Milliken Bros. Bessemer iron for last half is noticeably lower. Basic iron has not been sold up or watched as closely as Bessemer and last half is now quoted $23 to $23.50. Bessemer is quoted $23.50 to $23.75 for spot and $23.25 to $23.50 for last half. Northern No. 2 is quoted $25 valley for spot although some imported Middlesbrough No. 3 has been sold into the Pittsburg territory at $24 delivered. The large tonnages of English iron imported have made it plentiful and brought out some close competitive prices. A little No. 2 southern has been offered for last half at $21.50 and $22. For last half deliveries we qoute:

Bessemer, Valley	$23.25 to 23.50
Bessemer, Pittsburg	24.15 to 24.40
No. 1 Foundry, Pittsburg	25.40 to 26.30
No. 2 Foundry, Pittsburg	24.40 to 24.90
Gray Forge, Pittsburg	23.40 to 24.30
Basic, Valley	23.00 to 23.25
Basic, Pittsburg	23.40 to 24.15

Ferro-Manganese.—There has been but little new inquiry for ferro-manganese and consumers seem to be pretty well covered for their requirements. Prompt shipment ferro-manganese, foreign 80 per cent, is quoted $63 to $64 delivered Pittsburg, and for last half shipment, $62 to $63.

Imported 50 per cent ferro-silicon is quoted $109 to $110 Pittsburg, domestic 12 per cent, $36; 11 per cent, $35; 10 per cent, $34. The lower grades of imported ferro-silicon are quoted $1 lower. These quotations are applicable to Pittsburg territory. Western and central western prices, where the material is not subject to the competition of foreign grades, are higher and in the east a little lower.

Plates.—From a mill standpoint the situation as regards heavy and white plates has not changed, and the demand for material is even heavier than it has been, with the mills getting further behind on shipments from week to week. Delivery promises on universal plates by independent manufacturers have improved and shipments can now be made in from three to five weeks without much difficulty. The lake ship yards, aside from the business closed last week, are still in the market for a heavy tonnage of both plates and shapes for additional ships on the lakes, these to be turned out in time for the opening of navigation next year. We quote as follows:

Tank plate, ¼-inch thick, 6¼ to 100 inches, 1.80c to 1.90c f. o. b. mill Pittsburg for prompt shipment, and 1.70c base Pittsburg on future deliveries. Extras are as follows per 100 pounds: Boiler and flange steel plates, 0.10c. A. B. M. A. and ordinary firebox steel plates, 0.20c; still bottom steel, 0.30c; marine steel, 0.40c; locomotive firebox steel, 0.50c; all sketches, excepting straight taper plates varying not more than four inches in width at ends, narrowest end not being less than 30 inches, 0.10c; circles, 0.20c. Plates in width over 100 inches up to 110 inches, 0.05c; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches up to 130 inches, 0.50c; over 130 inches, 1.00c. Gages under ¼-inch to and including 3-16-inch plate on thin edges, 0.10c; under 3-16 to and including No. 8, 0.15c; under No. 8 and including No. 9, 0.25c. Five cents extra for less than carloads. Terms, net cash in 30 days.

Sheets.—The conference between the American Sheet & Tin Plate Co., and the Amalgated association resulted in an agreement to maintain the present wage scales and practically the same working conditions, the association abandoning its request for increased wages and the adoption of a tonnage basis for day hands. Market conditions are unchanged, specifications are normal, with nothing out of the ordinary having transpired during the week. We quote as follows:

Black steel sheets one pass, cold

rolled, Nos. 11-12, 2.20c; Nos. 13-14, 2.25c; Nos. 15-16, 2.30c; Nos. 17-21, 2.35c; Nos. 22-24, 2.40c; Nos. 25-26, 2.45c; No. 27, 2.50c; No. 28, 2.60c; No. 29, 2.75c; No. 30, 2.85c; galvanized, Nos. 10-11, 2.65c; Nos. 12-14, 2.75c; Nos. 15-16, 2.85c; Nos. 17-21, 3.00c; Nos. 22-24, 3.15c; Nos. 25-26, 3.35c; No. 27, 3.55c; No. 28, 3.75c; No. 29, 4.00c; No. 30, 4.25c; blue annealed, No. 10 and heavier, 1.85c; Nos. 11-12, 1.90c; Nos. 13-14, 1.95c; Nos. 15-16, 2.05c. Corrugated roofing, $1.90 per square for No. 28 painted, 2½-inch corrugation, and galvanized, $3.25 per square for No. 28.

Tin Plate.—The wage settlement on the old basis has removed labor difficulties for another year. Specifications, for this season of the year, are light, but with the improved conditions as reflected by the more favorable crop reports, heavier specifications from the canning interests are expected. There will be as little stoppage as possible for the midsummer repair work. The Shenango plant of the leading interest will be closed for a month to install automatic stokers. This plant contains 30 mills. The Sharon plant, containing 20 mills, will shut down for two weeks and others will be out for a less time. We quote:

Coke tin plate 100-pound basis, 14 x 20, $3.90 f. o. b. mill, Pittsburg district. Terms, 30 days, less 2 per cent for cash in 10 days.

Rails, and Track Material.—The local leading interest during the past week closed for 14,000 tons standard sections, a small portion of which is for 1908 delivery. While but very little is being said in regard to the Cassatt specification of the Pennsylvania railroad, the apportionment of the 1908 business has not yet been placed with the mills, the difficulty being an agreement as to price, the Carnegie Steel Co. quoting $33 mill for rails as demanded by the Pennsylvania Co. There has been no cancellation or disagreement between the railroad company and the steel company, and there has been no additional negotiation since the steel company quoted its price of $33. As far as can be learned the new specifications do not call for any radical change in the shape of the section, but demand that a much larger percentage of the ingot be cropped off before it is run through the rail mill, and it is also understood that the flange of the rail on the average 90-pound section will be made heavier, increasing the total weight 20 per cent. The new business on light rails has been about the average, running a little over 2,000 tons for the week. Standard spikes can be had for reasonably prompt delivery, but deliveries on hand spikes are more extended. Prices are unchanged and we quote as follows:

Fifty-pound and heavier, 500-ton lots and over, $28; carloads and less than 500 tons, $30; less than carload lots, $32; 8-pound, $40; 12-pound, $36 to $37; 16-pound, $35 to $36; 20-pound, $34 to $35; 25 to 45-pound, $33 to $34; angle splice bars for standard sections, $1.65; standard spikes for forward deliveries, $2.30 to $2.35 Pittsburg; hand spikes, $2.50 Pittsburg.

Hoops, Bands and Cotton Ties.—Pending several large negotiations that have been under way for the past two or three weeks, the new contract business for requirements of the year beginning July 1 has been practically at a standstill, but it is expected that a very heavy tonnage will be lined up before the end of the present week. Old contracts are fully specified. Beginning July 1 the price of cotton ties will be 96c per bundle, figured on 95 cents May basis, with the ½ cent per month carrying charge. We quote as follows:

Hoops in carload lots, 2c; in less than carload lots, 2.10c; bands, 1.60c, base half extras as per standard steel. Cotton ties, 96c per bundle.

Steel.—During the past four weeks the Cambria Steel Co. has sold practically 45,000 tons of steel billets at prices ranging from $29.50 to $30.50 at its mill at Johnstown. The average on the entire tonnage would be about $30. Forging billets have been sold at $35 mill. Despite the fact that this large tonnage of semi-finished material came out from the unusual source of supply for this steel, it has all been readily absorbed by the market without, in any way, affecting the price. Soft Bessemer billets 4 x 4 and larger are quoted $30 to $30.50 Pittsburg, and sheet bars nominally $31 mill Pittsburg or Youngstown.

Merchant Bars.—The heavy movement of the past month or six weeks has slowed down and manufacturers are under the impression that practically all of the agricultural implement interests have closed for their requirements for the year beginning July 1. An enormous tonnage of steel bars is going into the concrete reinforcement work. In the east the plain bar seems to be the favorite, while in the west and central west the deformed bar has the prestige. The bar iron situation has not changed, and for delivery in the Pittsburg district we quote 1.75c to 1.80c. For western shipment 1.60c base Pittsburg plus freight to point of delivery. We quote as follows:

Common iron bars, 1.75c to 1.80c Pittsburg in carload lots and over, 1.80c to 1.85c in less than carloads; Bessemer steel bars, 1.60c, net, for forward deliveries; 1.85c to 1.90c out of stock; plow and cultivator, 1.60c. net; channels, angles, zees, tees, under three inches, 1.70c, all f. o b. Pittsburg. The following differentials are maintained on steel: Less than 2,000 pounds, 0.10c advance; less than 1,000 pounds of a size, 0.30c advance. Cold rolled and ground shafting, 50 per cent off in less than carloads, delivered in base territory; open-hearth spring steel, 2.25c to 2.50c; sleigh shoe flats, 1.60c to 1.65c; smooth finished machinery steel, 1.90c to 2c; toe calk, 2.10c to 2.15c. The price of planished and machine straightened tire is 1.80c, base, half tire extras. Iron finished tire up to 1½ inch and over to be sold on regular bar basis of 1.60c base, half extras, steel card.

Structural Material.—There is a fair volume of new business in shapes being taken on right along and mills are not overly anxious to increase the volume on account of the shortage of semi-finished steel. Mills are in better shape now, however, than they have been for some time past as far as bookings are concerned. Construction companies are not receiving any large inquiries and the number of small contracts are being eagerly sought by the independent companies. The Ambridge plant of the American Bridge Co., is still congested and no promises this side of October are being made. Several large building projects are in the hands of architects, but bids on the work have not been asked. We quote:

Beams and channels, 15-inch, and under, 1.70c; over 15 inches, 1.80c; zees, 1.70c; tees, 1.70c; angles from three to six inches and inclusive, 1.70c; over six inches, 1.80c; universal and sheared plates, 6¼ inches and wider, 1.80c base.

Wire and Wire Nails.—Deliveries are still slow and the volume of new business, despite the summer season, is still great. Prices are unchanged and we continue to quote:

Wire nails, jobbers' carload lots, $2; retailers' carload lots, $2.05; less than carloads, $2.10; painted barb wire, $2.15, for jobbers in carloads; retailers in carloads, $2.20; and less than carload, $2.30, with 30c for galvanizing; plain wire, $1.85 for jobbers, and $1.90 by carload.

Merchant Pipe.—The Columbia Gas & Electric Co. has closed with the National Tube Co. for 190 miles of 16- and 20-inch line pipe to be laid from Roane county, West Virginia, to Cincinnati, and during the week under review several contracts for small mileages have been closed by the various manufacturers. The new mer-

chant pipe business continues very heavy and deliveries are as extended as they have been. Manufacturers are practically swamped and are making very indefinite delivery promises. We quote the following consumers' discounts subject to one point and five to jobbers in large lots:

	—Steel— Black.	Galv.
¼ and ⅜ inch	65	49
½ inch	67	53
⅝ inch	69	57
¾ to 6 inches	73	63
7 to 12 inches	70	55
EXTRA STRONG PLAIN ENDS.		
¼ to ⅜ inch	58	46
½ to 4 inches	65	53
4½ to 8 inches	61	49
DOUBLE EXTRA STRONG PLAIN ENDS.		
½ to 8 inches	54	43

Iron Pipe.—The pressure of new business and demands for deliveries on old contracts is very heavy and very few, if any, delivery promises are being made on new contracts. Prices are unchanged and we quote the following discounts to consumers:

RANDOM LENGTHS WITH THREADS AND COUPLINGS—CARLOAD LOTS.	Black.	Galv.
⅛, ¼ and ⅜ inch	59	43
½ inch	62	51
¾ and 6 inch	67	57
7 and 8 inch	62	46
PLUGGED AND REAMED.		
1 to 4 inch	65	55
EXTRA STRONG PLAIN ENDS.		
⅛, ¼ and ⅜ inch	52	40
½ to 4 inch, inc	59	47
4½ to 8 inch	55	42
DOUBLE EXTRA HEAVY PLAIN ENDS.		
½ to 3 inch, inc	48	37

Boiler Tubes.—The business placed for boiler tubes during the past week has been particularly heavy on account of the contract period ending July 30, and all business on old contracts must be specified by that time in order to be taken out. The National Tube Co. has four of its new boiler tube furnaces at McKeesport in operation. It will be a year before the entire plant is completed. We quote the following official discounts:

	Iron.	Steel.
1 to 1½ inch	42	47
1¾ to 2¼ inch	42	59
2½ inch	47	61
2¾ to 5 inch	52	65
6 to 13 inch	42	59

2¼ inches and smaller, over 18 feet, 10 per cent net extra.
2¾ inches and larger, over 22 feet, 10 per cent net extra.

Coke.—The Westinghouse Electric during the past week closed for its coke for a year beginning July 1, 14 to 16 cars per week, at $3 per ton at the ovens, for standard Connellsville foundry grades. The Frick Coke Co. has closed for a large tonnage with plants in which it owns a one-half interest on a monthly average basis, the price for each month to be fixed on the 15th, beginning in July. Spot foundry coke is quoted $3 to $3.15 to consumers, and last half from spot prices to as high as $3.30. The Lackawanna Steel Co last week cleaned up practically all the spot furnace coke in the region and on account of emergency conditions paid all the way from $2 to $2.60. Prices have apparently stiffened up for the time being, but indications point to an ample supply of spot coke through the summer. It is reported the Frick Coke Co. has shut down a large number of its ovens. Spot furnace coke is quoted $2.15 to $2.25, and last half $2.30 to $2.45.

Old Material.—The Carnegie Steel Co. during the week bought a quantity of steel turnings and bundled sheet scrap and has an open proposition to take heavy melting stock at $18, but very little is offered at these figures. The Crucible Steel Co. is in the market for 500 tons of open-hearth scrap for its Park plant. A majority of consumers are comfortably fixed on their supply of old material and two of the largest in this district will not be in the market before August. Prices are a little easier and heavy melting is offered at $18.25 to $18.75, a drop of 25 cents. Dealers are not very active, except in cases where they loaded up recently in anticipation of an advance, and they are now quietly letting go of their material. Reports from the east are to the effect that prices are falling off, but reports from Chicago indicate a steady condition. Producers of scrap are offering material more freely. For delivery in the Pittsburg district, gross tons, we quote:

Heavy melting scrap, $18.50 to $18.75; re-rolling rails, $19 to $19.50; bundled sheet scrap, $16 to $16.50; iron axles, $31 to $31.50; old iron rails, $23 to $23.50; No. 1 wrought scrap, $18.50 to $18.75; old car wheels, $24.50 to $25; low phosphorus scrap, $23 to $23.50; machine shop turnings, $15.25 to $15.75; axle turnings, $15.75 to $16; cast borings, $13.50 to $14; No. 1 cast scrap, $21 to $21.50.

CHICAGO.

Market Dull in Nearly All Lines.—Contract for Cast Iron Pipe.

Office of THE IRON TRADE REVIEW,
1362 Monadnock Block, June 25.

A contract for 2,100 tons of cast iron pipe has been awarded to the leading producer by the city of Chicago. This is the only important transaction in the week under review. Excepting merchant pipe and boiler tubes, for which there is a brisk demand, new tonnage in other lines of iron and steel is very light. Specifications, however, are satisfactory, the only diminution is attributed to the high costs of all kinds of building material and the consequent postponement of many projects. Scrap has weakened in sympathy with the dullness in pig iron, and prices of old material have declined from 75 cents to $1.50 a ton. The scarcity of billets has been lifted and quick deliveries can now be had from eastern mills.

Pig Iron.—Almost absolute quietness prevails alike on forward iron as well as spot. "Pick-up" orders for filling-in purposes form the bulk of current transactions, and even these are scattered. No further recessions in prices of spot iron beyond the decline of $1 mentioned last week, have occured. Neither have quotations on forward deliveries been in the least affected by the lull. Southern No. 2 on local tracks is held at $22 Birmingham, or $26.85 Chicago. The minimum for northern No. 2, immediate shipment, is $26 Chicago. Lake Superior charcoal has softened slightly, and purchases for the last half can be made at a spread of $27 to $27.50. Iron continues to go forward to melters at full contract quotas, indicating no diminution in consumption. Our quotations for the third and fourth quarters are given below; the maximum prices are for the former, and the minimum the latter:

Lake Superior Charcoal	$27.00 to 27.50
Northern Foundry No. 1	25.50
Northern Foundry No. 2	25.00
Northern Foundry No. 3	24.50
Northern Scotch Foundry	25.50
Southern Foundry No. 1	24.85 to 26.35
Southern Foundry No. 2	24.35 to 25.85
Southern Foundry No. 3	23.85 to 25.35
Southern Foundry No. 4	23.35 to 24.85
Southern No. 1 Soft	24.85 to 26.35
Southern No. 2 Soft	24.35 to 25.85
Southern Gray Forge	22.85 to 24.35
Southern Mottled	22.60 to 24.15
Southern Silveries, 4 per cent to 6 per cent Silicon	27.85 to 28.85
Jackson Co. Silveries, 6 per cent	29.40 to 29.90
Jackson Co. Silveries, 8 per cent	30.40 to 30.90
Jackson Co. Silveries, 10 per cent	31.40 to 31.90
Malleable Bessemer	25.00

Billets and Rods.—While no weakness is apparent in intermediate steel products, it is noticeable that mills are more actively seeking new tonnage. For the first time in some months, eastern producers are "drumming" the local trade, quoting for small lots on the basis of $38 Chicago for 4 x 4 up to 10 x 10 forging billets. On large tonnages, as low as $36 can be done. Wire rods are unchanged at $37, Pittsburg.

Merchant Bars.—Independent makers report that contracts for steel bars are free, one interest having taken an aggregate of 2,000 tons daily for ten days past. The leading producer is pretty well filled for the season of 1907-08, and is receiving specifications in satisfactory volume. New business in bar iron is only fair, but prices remain firm on the basis of 1.60c Pittsburg. Some of the western mills are anticipating closing down for a couple of weeks next month. We quote carload lots, Chicago delivery, as follows:

Bar iron, 1.78c to 1.83c; soft steel bars and bands, 1.78c half extras; soft steel angles, less than 3 x 3, 1.88c; hoops, 2.18c base, full extras; planished or smooth finished tire steel,

1.98c; iron finish, up to 1½ x ¼ inch, 1.93c base; iron finish, 1½ x 1½ inch and larger, 1.78c base; channels for solid rubber tire ¾ to 1 inch, 2.28c, and 1⅛ inch and larger, 2.18c; smooth finished machinery steel, 2.18c; flat sleigh shoe 1.83c; concave and convex sleigh shoe, 2.08c; cutter shoe, 2.36½c; toe calk steel, 2.33c; railway spring, 1.98c; crucible tool steel, 7c to 9c, with higher prices asked on special grades. Quotations on shafting are irregular, though the official prices are without change at 50 per cent off in car lots, and 45 per cent in less than carload lots, base territory. On iron and steel bars from local stocks, we quote as follows: Bar iron, 2.25c full extras; soft steel rounds, and square, 3-inch and larger, $2 per 100 pound base; flats, 2 inches to 4 inches by ⅛ inch and larger, $2 per 100 pounds base; 4½ inches by 5 inches and 6 inches by 5-16 inch and thicker, $2 per 100 pounds base; all ovals, half rounds, $2 per 100 pounds base; steel bands, $2 half extras; soft steel hoops, $2.50 full extras. Other sizes not mentioned above, $2 per 100 pounds base plus half extras.

Plates.—Premium business is decreasing very rapidly, many manufacturers being in position now to give reasonably early shipment. Specifications keep up admirably well, but new tonnage is not so steady. Prices are without change as follows:

Plates, ¼ inch and heavier, 6¼ to 100 inches wide, either universal or sheared, 1.70c to 2c Pittsburg base. For extras see Pittsburg report. Freight rate to Chicago, 18c per 100 pounds for carload lots, and 20c per 100 pounds for less than carload lots. Jobbers' prices for shipment from local stocks are as follows: Tank steel, ¼ inch and heavier up to 72 inches wide, 2.20c; 3-16 inch up to and including 60 inches wide, 2.30c; 3-16 inch, 72 inches wide, 2.55c; No. 8 up to 60 inches wide, 2.50c. Flange steel, 25c extra; heads, 25c extra.

Sheets.—The ability of mills to give delivery on blue and box annealed sheets within six to eight weeks, reflects the easier conditions prevailing in those products. Two months ago, twelve weeks' time was required. Galvanized sheets are a little further behind, but mills are gradually filling in this gap. Since the advent of hot weather, new tonnage in galvanized and black sheets has declined, but the consumption of corrugated sheets has increased proportionately. Prices are without change as follows:

Black sheets, Nos. 8, 9 and 10, 1.90c Pittsburg; No. 28, 2.60c Pittsburg. Galvanized sheets, No. 28, 3.75c Pittsburg. Freight to Chicago, 18c per 100 pounds for carload lots, and 20c for less than carload lots. Jobbers' prices on carload lots and less from store are as follows:

No. 10, 2.50c to 2.55c; No. 12, 2.55c to 2.60c; No. 14, 2.60c to 2.65c; No. 16, 2.70c to 2.80c; Nos. 18-20, 2.80c to 2.90c; Nos. 22-24, 2.85c to 2.95c; No. 26, 2.90c to 3c; No. 27, 2.95c to 3.05c; No. 28, 3.05c to 3.15c; No. 30, 3.35c to 3.45c. Galvanized sheets, No. 10 to 20, 3.50c to 3.55c; Nos. 22 and 24, 3.65c to 3.75c; No. 26, 3.85c to 3.90c; No. 27, 4.05c to 4.15c; No. 28, 4.25c to 4.35c; No. 30, 5.40c to 5.45c.

Structural Steel.—Figures are being taken for the erection of the new Frisco shops at Springfield, Mo. The Arnold Co., Chicago, is the architect and designer. About 3,000 tons of steel will be required for the frame work. Bids will be issued July 5 for the LaSalle hotel to be erected at the corner of Madison and LaSalle streets, Chicago. The steel requirements of this building are estimated at 7,000 tons. These are the only two projects of the large number pending of which there is assurance that they will be closed. Hesitation towards closing for new enterprises has increased in the past two months, and specifications and new tonnage from fabricators reflect this timidity. The American Bridge Co. reports only one important contract in the week under review. This was for the 920 tons of steel required in the erection of the 18th street viaduct, St. Louis, the contract for the erection of which was secured by the Missouri Bridge & Iron Works. We quote prices without change as follows:

Beams and channels, 3 to 15 inches inclusive, 1.70c Pittsburg. For extras see Pittsburg report. Freight rate from Pittsburg to Chicago, 18c per 100 pounds for carload lots, and 20c per 100 pounds for less than carload lots. Quotations from store are as follows:

All angles, three inches and larger, including six inches, $2.10 per 100 pounds; angles over six inches, $2.15 per 100 pounds base; beams, 3 to 15 inches inclusive, $2.10 per 100 pounds base; channels, three inches and larger, $2.10 per 100 pounds base. Less than carload lots are $1 a ton higher than foregoing prices.

Rail and Track Supplies.—An uneventful week in rail tonnage has passed, not a single order for 1908 rolling having been placed with the local mill. The demand for light rails and track supplies for this year's delivery is good. Quotations are as follows:

Bessemer rails, $28 to $30; less than 500-ton lots, $32; open-hearth rails, $29; light rails, Bessemer, 30 to 45-pounds sections, $35; 25-pound, $36; 20-pound, $37; 16-pound, $38; 12-pound, $39, and lighter sections down to 8-pound, $45.50, all f. o. b. mill. Track supplies vary in price according to quantity and delivery. On orders accompanying rail contracts for future delivery, we quote angle bars, 1.65c; spikes, 2.35c; bolts with square nuts, 2.65c; with hexagon nuts, 2.80c. For carload lots or less, for prompt shipment, the following prices are asked: Angle bars, 2.25c to 2.75c; spikes, 2.60c to 2.70c; bolts with square nuts, 2.85c; with hexagon nuts, 3c.

Cast Iron Pipe.—The United States Cast Iron Pipe & Foundry Co. has received the contract for 2,100 tons of 8-inch to 12-inch pipe from the city of Chicago. A few lots of 100 and 200 tons, together with a good routine business, constitutes the week's sales. Prices are without change as follows: Four-inch water pipe, $38.60; 6 to 12-inch inclusive, $37.60; gas pipe, $1 a ton higher.

Merchant Pipe and Boiler Tubes.—No cessation is noted in the demand for either product. The crowded condition of mills is bringing out a good volume of business for forward shipments, the suggestion having gone forth that to insure delivery at the requisite time orders should be placed early. Deliveries on old contracts are very slow, and stocks in jobbers' hands are low. We quote mill prices, carload lots, Chicago delivery, as follows: On steel pipe, jobbers are allowed a concession of one point and five per cent additional from the schedule in force.

MERCHANT PIPE.

	—Steel— Black.	Galv.
¼ to 6 inches, inclusive.....	71.2	61.2
BOILER TUBES.	Steel.	Iron.
2¼ to 5 inches, inclusive.....	62.2	49.2

Mill quotations on iron pipe are from four to five points higher than above. A concession of one point from the following quotations, is allowed by Chicago jobbers on orders for shipment from local warehouse stocks. We quote for less than carload lots as follows:

MERCHANT PIPE.

	Black.	Galv.
⅛ to ¼ inch.....	60	44
⅜ inch	62	48
½ inch	64	52
¾ to 6 inches.....	68	58
7 to 12 inches.....	64	49

Minimum prices for wrought iron pipe, carload lots or greater, from Chicago stocks, are as follows: ⅛ inch to ¼ inch, 55; ⅜ inch, 57; ½ inch, 59; ¾ inch to six inches, 64; 7 inch to 12 inches, 59. Boiler tubes from store are unchanged at 60 off for steel; 47½ for iron, and 42½ for seamless, base sizes, 2¼ inches to 5 inches.

Wire Products.—Despite the lateness of the season, new business keeps up remarkably well. Specifications are also active, and on account of the better car and steel supply mill shipments are heavier. Jobbers' quotations are without change as follows:

Wire nails, $2.18; painted barb wire, $2.33; galvanized barb wire, $2.63; smooth annealed wire, $2.03; smooth galvanized wire, $2.33; polished staples, $2.28; galvanized staples, $2.58. Carload lots to retailers, five cents higher; less than carload lots, 15 cents higher.

Coke.—Local demand is not of proportions to excite comment. Contracts being closed for forward requirements at a range from $2.75 to $3.00, ovens for foundry coke, and $2.25 to $2.40 ovens for furnace coke.

Old Material.—The upward movement of scrap came to an end last week. Heavy selling by a large brokerage interest, combined with announcements of summer shut-down by several mills and slow movement in pig iron and other metals precipitated a slump of headlong proportions. The fictitious foundation of the market was apparent in the rush to unload on the first bearish influence to appear. Values have declined from 75 cents to $1.50 a ton, and are still falling. There is absolutely no buying, except by dealers who had previously sold short, and who are only covering to protect these contracts. We have revised our prices and quote as follows, gross tons being given in first paragraph:

Old Car Wheels	$24.50 to 25.00
Old Iron Rails	24.00 to 24.50
Rerolling Rails (3 feet and over)	18.25 to 18.75
Old Steel Rails (3 ft. and under)	18.50 to 19.00
Light Section Relayers, 45 lbs. and under, subject to inspection	30.00 to 32.00
Relaying Rails, subject to inspection	28.00 to 30.00
Frogs, Switches and Guards	17.50 to 18.00
Heavy Melting Steel	16.00 to 16.50
Mixed Country Steel	12.50 to 13.00
We quote net tons as follows:	
No. 1 R. R. Wrought	$15.75 to 16.25
No. 2 R. R. Wrought	14.75 to 15.25
Knuckles, Couplers and Springs	16.00 to 16.50
Shafting	17.75 to 18.25
Dealers' Forge No. 1	13.50 to 13.75
Pipes and Flues	12.75 to 13.25
No. 1 Cast, 150 lbs. and less	18.50 to 19.00
No. 1 Mill	10.25 to 10.75
Mixed Busheling (Nos. 1 and 2)	11.75 to 12.25
Country sheet	9.25 to 9.50
No. 1 Boiler Cut	11.75 to 12.25
Boiler Punchings	14.50 to 15.00
Cast Borings	10.50 to 11.00
Mixed Borings, etc	10.50 to 11.00
Machine Shop Turnings	12.00 to 12.25
Railroad Malleable	16.25 to 16.75
Agricultural Malleable	15.50 to 15.75
Stove Plate and Light Cast Scrap	15.00 to 15.50
Old Iron Splice Bars	18.75 to 19.25

CLEVELAND.

Large Sales of Structural Material.—Heavy Ore Shipments.

Office of THE IRON TRADE REVIEW, Browning Bldg., June 25.

Iron Ore.—The shipments from Lake Superior ranges have been extremely heavy during the week, and indications are that the shipments for the month will amount to more than 6,300,000 tons. Railroads are giving satisfactory service in carrying the ore from lower lake ports to furnaces. The indications are that, although the movement for the season from the Mesabi and Vermillion ranges will show a very large gain, the shipments from the old ranges will not be much in excess of those of last year. Throughout the ranges, and especially in Michigan, the labor problem is a very serious one, and as the harvest period approaches, it is expected that considerable difficulty will be experienced in keeping miners from going to the fields.

Pig Iron.—The extreme quiet noted last week has continued, and spot prices are lower, sales having been made at $24 at Cleveland furnace for No. 2. Very little interest is being manifested by either buyers or sellers in next year. Prices for future delivery have not changed, and we quote, f. o. b. Cleveland for last half, as follows:

Bessemer	$23.90
No. 1 Foundry	24.50
No. 2 Foundry	24.00
No. 3 Foundry	23.50
No. 2 Southern	24.35
Gray Forge	22.50

Coke.—Contracting for coke by foundrymen has been very large during the last two weeks, but is now about ended, as the foundrymen have nearly all covered for their requirements for the present year. We quote furnace coke at $2.15 to $2.50 for spot delivery, and $2.25 to $2.50 for last half. The demand has improved. For last half delivery, foundry coke is selling at $3.15 to $3.25, with one important interest still holding at $3.50 and making sales at that figure.

Finished Material.—Very few sales are reported, and some manufacturers, such as makers of steam shovels, report a decrease in business. Specifications are coming in satisfactorily, and there are no indications of weakness. Users of iron bars are urging deliveries before the shut down of the mills, July 1. Ten thousand tons of structural shapes, not including 1,000 for the new First National Bank building, have been sold during the week.

Old Material.—Quietness prevails in old material and further declines in prices are looked for within the next month. Turnings are especially quiet in comparison with their strong position in the past. Borings are firmer than turnings. The recent rise in quotations through which the market has passed, has shown an unusual differential between turnings and borings, and where $3 was formerly expected there has been a decline below $2, and in some points as low as $1. Cast scrap and stove plate are fairly strong, but old car wheels even at lower prices are less firm. The Nickel Plate railroad closed a small list at good prices during the week. We quote prices, f. o. b. Cleveland, gross tons, unchanged, as follows:

Old iron rails	$24.00 to 25.00
Old steel rails (re-rolling)	17.75 to 18.75
Old steel rails (under 6 feet)	17.50 to 18.50
Old car wheels	23.50 to 24.50
Steel boiler plate	14.50 to 15.50
Steel axles	22.00 to 23.00
Malleable iron (railroad)	19.00 to 19.25
Malleable iron (agricultural)	17.25 to 17.75
Heavy steel	16.75 to 17.25
Country mixed steel	15.25 to 15.75
Low Phosphorus	21.50 to 22.50
No. 1 R. R. wrought	$16.50 to 17.00
No. 1 busheling	14.50 to 15.00
No. 1 machine cast	18.75 to 19.25
Iron axles	26.00 to 26.50
Axle turnings	13.50 to 14.00
Machine shop turnings	12.50 to 13.00
Grate bars	15.00 to 15.50
Pipes and flues	14.00 to 15.00
Tank iron	12.50 to 13.50
Hoop and band iron	8.50 to 9.00
Sheet iron	7.50 to 8.50
Wrought drillings	12.50 to 13.00
Stove plate	14.50 to 15.00
Cast borings	10.75 to 11.25

Joseph Nagusky & Co., have opened offices at 603 New England building, Cleveland. The company will deal in iron and steel scrap.

CINCINNATI

Pig Iron Quotations Lower and Demand Slack—Coke is Weak.

June 25.

Pig Iron.—Spot iron is easier and lower. Sales at the close of the week under review have been made at $20.50 to $21.00 Birmingham. There is only a limited call for prompt shipment iron and ample offerings. Some resale iron is coming out in addition to the furnace offerings. Quotations for prompt delivery delivered Cincinnati are as follows:

Southern Foundry No. 1	$24.25 to 24.75
Southern Foundry No. 2	23.75 to 24.25
Southern Foundry No. 3	23.25 to 23.75
Southern Foundry No. 4	22.25 to 22.75
Southern No. 1 Soft	24.25 to 24.75
Southern No. 2 Soft	23.75 to 24.25
Southern gray forge	20.75 to 21.25
Northern No. 1 foundry	25.65 to 26.65
Northern No. 2 foundry	25.15 to 26.15
Northern No. 3 foundry	24.65 to 25.65

The general market is dull and there is more pressure to sell iron now than demand. Desirable business has brought about price concessions. A large malleable iron user in Indiana is reported to have bought 3,000 tons of Ohio malleable, divided between three furnaces, each one taking on 1,000 tons for delivery over the first half of next year on the basis of $20.50 at furnace. This is regarded as practically establishing this price for foundry iron as well as malleable.

Southern irons have been quiet, but nominal quotations are weaker. There

is an inquiry for a small tonnage of spot gray forge on which it is expected that better than $18.00 Birmingham will be done. The leading interest in cast iron pipe is calling for a list of offerings with prices for the last half of the year. Southern irons are quotable at $20.50 to $21.00 for third quarter, $19.00 to $19.50 for last quarter, and $18.25 to $18.50 for first half of 1908.

Northern iron for third quarter is quoted at $23.00 to $24.00, for fourth quarter at $22.00 to $22.50, and for first half of 1908 at $20.50 to $21.00 at furnace. There appears to be more iron for sale over the balance of this year than seemed likely a few weeks ago. The dullness which has prevailed has had the effect of bringing it to the surface. Furnace interests are to some extent more eager to make sales. We quote for fourth quarter delivery, delivered Cincinnati, as follows:

Southern Foundry No. 1	$22.75 to 23.25
Southern Foundry No. 2	22.25 to 22.75
Southern Foundry No. 3	21.75 to 22.25
Southern Foundry No. 4	21.25 to 21.75
Southern Foundry No. 1 Soft	22.75 to 23.25
Southern Foundry No. 2 Soft	22.25 to 22.75
Gray Forge	20.75 to 21.00
Northern Foundry No. 1	23.65 to 24.15
Northern Foundry No. 2	23.15 to 23.65
Northern Foundry No. 3	22.65 to 23.15

Finished Material.—There has been a good business in steel bars for forward delivery. The retailing demand for all descriptions is good. Less than car load orders are filled here at the following prices:

Angles, 3 x 3 and over, 2.15c to 2.25c; beams and channels, 15 inches and under, 2.15c; small angles and architectural channels, 2.10c base; plates ¼ inch and heavier, 2.10c; 3-16 inch 2.20c; No. 8, 2.20c; sheets (blue annealed) No. 10, 2.30c; No. 12, 2.35c; No. 14, 2.40c; No. 16, 2.50c; box annealed sheets, Nos. 18 and 20, 2.65c; Nos. 22 and 24, 2.75c; Nos. 25 and 26, 2.80c; No. 27, 2.85c; and No. 28, 2.95c. Iron and steel bars, 2.00c base; boiler tubes, 62 per cent off base; turnbuckles, 45 per cent off; rivets, 3.15c base; cold rolled shafting, 45 per cent off list; steel tire, 2.10c base.

Coke.—Consumers of foundry grades are showing signs now of having made their contracts and there is not such an active market as in the recent past. There is still plenty of coke offering and at easy prices. Spot coke is weak. Some desirable contracts have been placed recently at concessions below recognized quotations. Practically all sales channels have coke to sell and are able to shade current quotations on some brands. A few well-known makes of established reputation are firmly held. There is some talk of the leading steel interest coming into the market in the near future and this is expected to give the market a steadier tone. Prices in the leading coke producing districts are as follows:

Wise County, Va., Furnace Coke, prompt shipment	$2.40 to 2.50 per ton
Wise County, Va., Foundry Coke	3.00 to 3.10 per ton
Pocahontas Furnace Coke, prompt shipment	2.50 to 2.75 per ton
Pocahontas Foundry Coke	3.00 to 3.25 per ton
Connellsville Furnace Coke, prompt shipment	2.40 to 2.65 per ton
Connellsville Foundry Coke	2.90 to 3.50 per ton
New River Foundry Coke, prompt shipment	3.00 to 3.50 per ton
New River Furnace Coke, contract	2.65 to 2.75 per ton

Old Material.—An easier feeling prevails in sympathy with markets elsewhere. There is a fair demand from melters, however, and while sales are made at concessions, trade is normal with ample offerings. We quote:

Old No. 1 R. R. wrought net tons	$17.00 to 17.50
Cast machine and f'dy, net tons	19.25 to 19.75
Old iron rails, gross tons	24.50 to 25.50
Old steel rails, gross tons	18.25 to 19.25
Old short lengths, gross tons	18.00 to 19.00
Old iron axles, net tons	26.50 to 27.00
Heavy melting scrap, gross tons	22.00 to 22.50
Stove plate, net tons	15.00 to 15.50
Wrought turnings, net tons	13.00 to 13.50
Cast borings, net tons	11.00 to 11.50
Car wheels, gross tons	24.00 to 25.00

PHILADELPHIA.

Markets Extremely Quiet, But There Is No Sign of Weakness.

June 25.

Pig Iron.—There is a genuine midsummer lull in the market, and new business has fallen to the lowest point touched in many months. At the same time, there is no pronounced weakness. It is only a sort of tacit understanding between both sides to wait and see what the near future will bring forth. The matter was pretty thoroughly discussed at the meeting last week of the Eastern Pig Iron Association, when reports were presented showing practically all the furnaces sold up for four or five months, and no stocks on hand. The situation was considered sufficiently encouraging to justify the producers in standing pat and refusing to make any considerable concessions to buyers. Of course, a difference of a quarter or so would not be allowed to stand in the way of a good sale, but there is no disposition to drum up business at the expense of prices. An element of strength, to which comparatively little attention has been paid, is the gradual cessation of English iron imports. No commitments, so far as can be learned, have been made beyond the early part of August, and these could be canceled, if the market showed any decided weakness. The elimination of these imports will do much to offset the increased capacity of the furnaces through the coming in of new ones. Prices show no material change in the small sales reported. Basic shows strength because no less than four furnaces contributary to this market have either had to close down entirely for repairs, or have been crippled temporarily. In the prices that follow for the last half of the year the outer range represents third quarter figures, and the lower prices based on sales covering the entire six months. Quotations for the fourth quarter alone are 25 to 50 cents lower. In the cessation of demand, premiums for spot delivery have been entirely eliminated. Quotations for the remainder of 1907 are about as follows:

No. 1X Foundry	$25.00 to 26.00
No. 2X Foundry	24.00 to 25.00
No. 2 Plain	23.50 to 24.00
Standard Gray Forge	22.25 to 22.75
Basic	23.00 to 24.00
Low Phosphorus	27.75 to 28.00

New Material.—The market remains very quiet, and the mills, while they have plenty of work to assure their activity for many weeks, would be glad to see more new business coming in. This applies to practically all branches. Prices remain unchanged, as follows: Beams, channels and angles, according to specifications, 1.83½c to 2c; refined iron bars, 1.83½c to 1.88½c; steel bars, 1.78½c to 1.83½c; plates, 1.98½c to 2.03½c.

Old Material.—The prospective July closing down of many mills for the annual stock-taking and repairs has its natural effect on the scrap market, which is extremely dull. Steel scrap shows a little weakness, but there is little other change, and prices continue practically stationary, as follows:

Old steel rails	$19.50 to 20.00
No. 1 steel scrap	18.75 to 19.25
Old steel axles	22.50 to 23.00
Old iron axles	31.00 to 32.00
Old iron rails	27.00 to 28.00
Old car wheels	24.00 to 25.00
Choice scrap R. R. No. 1 wrought	20.00 to 20.50
No. 1 yard scrap	18.50 to 19.00
Machinery scrap	21.50 to 22.00
Low Phosphorus scrap	24.00 to 25.00
Wrought iron pipe	16.00 to 17.00
No. 1 forge fire scrap	17.00 to 17.50
No. 2 forge fire scrap, ordinary	11.50 to 12.00
Wrought turnings	16.75 to 17.25
Axle turnings, heavy	17.00 to 17.50
Cast borings	16.25 to 16.75
Stove plates	17.50 to 18.00

NEW YORK.

Improvement in Structural Material.—Importing of Pig Iron Nearly Ended.

Office of THE IRON TRADE REVIEW, Room 1005, No. 90 West St., June 25.

Pig Iron.—Except for the slight activity incident to the resale of the early delivery iron released by the closing down of the Milliken steel plant, the local market is without interest. At the time of the failure Milliken Bros. had contracted for

about 40,000 tons of iron for delivery through the last half. Most of that for shipment during the third quarter has already been placed with other melters, a pump interest in this territory taking between 3,000 and 4,000 tons, and no difficulty is anticipated in closing out the small remainder, though concessions in early iron are reported to have been made in connection with the tonnage already disposed of. Spot and later delivery prices are now nearer identical than at any time during the past year. Some selling interests are quoting from fifty cents to one dollar a ton lower than a fortnight ago, but in most cases these are concerns with little iron yet to dispose of. A sale of 2,000 tons of foundry for delivery late in the year is reported at a price equivalent to $23.50 New York, a pipe interest has taken about 3,500 tons of iron grading a little better than gray forge and some less important transactions have been made. Otherwise inquiry is light and there is seemingly no disposition to close up some large outstanding inquiries for the present. The British market opened the week at about 55 shillings for No. 3 Middlesbrough and probably as low as $20.75 can be done at seaboard for delivery a little later. Connal's stocks, June 13, were down to 284,000 tons, however, a decrease of about 16,000 tons in a week, and this is pointed out as indicating an advance later on. Most of this was for American account, as the continental movement has practically ended. No further American engagements are now being made. We quote tidewater prices as follows, the higher figure in each instance being for prompt delivery:

Northern Foundry No. 1	$24.00 to 25.00
No. 2X Foundry	23.50 to 24.50
No. 2 Plain	23.00 to 24.00
No. 2 Southern Foundry	23.50 to 25.50
Basic	23.00 to 24.00

Ferro-Manganese. — Accumulated stocks have been cleared away to a considerable extent and the market is slightly firmer, though the current demand is very light. Russian labor troubles are again threatened. For early shipment we quote seaboard prices on 80 per cent from $65.00 to $66.00; for later delivery the range is $63.00 to $64.00.

Finished Materials.—Increased activity is noted in structural materials and semi-finished forms. Inquiries now pending call for 7,000 tons of bridge materials for the Great Northern and 14,000 tons for the Northern Pacific, 2,700 tons for the Philippine railway and several turntables for export to Japan and the Philippines in addition to local building work. The Carnegie Steel Co. is to furnish about 5,000 tons of steel bars for concrete reinforcement for use in the subway extension and for the same work the American Bridge Co. will furnish 4,000 tons of fabricated shapes, Snare & Treat securing another thousand. The Bridge company has also taken the Jewelers' Exchange building, New York, 2,400 tons; an express building in Newark for the Pennsylvania railway, 900 tons; Cleveland extensions for the American Steel & Wire Co., 2,100 tons; the Mills building in San Francisco, 1,100 tons; and a number of smaller railway orders.

The plate and structural situation is somewhat improved by reason of the fact that the carrying out of the Milliken contracts by the receivers will necessitate the purchase of considerable tonnages of building materials. It develops that only a light stock was on hand at the time of the failure. So far the receivers have given their attention to only a part of the contracts held by the company, but in each instance the decision was reached to carry on the work to completion. As the steel-making department has been closed down for a considerable period—as is evidenced by the scattering of the managerial and labor forces—the local billet market will also benefit, a considerable part of the company's output having been disposed of in this form. The local demand for plates is rather spasmodic, shops in this district being only fairly well filled with orders. Sales of about 700 tons to buoy and tank works are reported. The tendency is toward lower premiums on quick shipments.

Angles, 3 to 6 inches x ¼ inch and heavier, 1.86c; beams, 3 to 15 inches, 1.86c; tees, 3 x ¼ and heavier, 1.91c; plates, carloads, tank, 1.96c; marine boiler, 2.26c; bar iron, 1.86c; soft steel bars, 1.76c; sheets, No. 28, black, 2.60c.

Old Material.—The scrap situation in this district is generally easier, with a lighter demand noted for rolling mill lines. The closing down of the Milliken Steel Works and the diversion of a considerable tonnage of steel scrap has also had a weakening effect and offerings are more numerous, though prices are not appreciably lower. The feeling prevails, however, that the market will shortly be stablished on a lower level. We quote New York delivery, gross tons, as follows:

Old iron rails	$24.50 to 25.50
Old steel rails, long lengths	18.00 to 18.50
Old steel rails, short pieces	16.50 to 17.00
Relaying rails	28.00 to 29.00
Old car wheels	24.00 to 24.50
Old iron car axles	28.50 to 29.50
Old steel car axles	21.00 to 21.50
Heavy melting steel	16.75 to 17.25
No. 1 railroad wrought	18.00 to 18.50
Iron track scrap	17.00 to 17.50
Wrought pipe	14.00 to 14.50
Cast borings	14.00 to 14.50
Wrought turnings	14.75 to 15.25
Heavy cast scrap	18.75 to 19.25
Railroad malleable	17.00 to 18.00
Agricultural malleable	15.00 to 16.00
Stove plate	15.50 to 16.00
Grate bars	14.50 to 15.00

BUFFALO.

Decreased Interest in Spot Iron.—A Very Quiet Market.

June 26.

Pig Iron.—Very little activity is observed in the market. The past week has been particularly quiet and business will probably be slow for the next three weeks when it is expected more tonnage wil be covered. Most of the consumers appear to have all the iron ordered which they feel they need for the year. Consequently inquiries are light and only for small tonnage.

Conflicting reports are heard relative to business conditions which affect the consumption of pig iron, some saying there is to be a quiet period of several months' duration, while others feel that prosperous conditions will be the predominating influence. It would appear from statements made by those in touch with the trade that a strong market will prevail and that business is not likely to be slack. From reliable sources it is learned business interests are thriving and there is much activity throughout the central part of New York state. A more quiet feature is reported from the southern part.

The output of local furnaces and deliveries greatly exceed at present the orders placed. This condition has been developing steadily for several months but it was not until recently believed that the deliveries would so far exceed orders. The position is taken by many that if prosperous conditions are enjoyed, there will be a shortage of iron before the year is far gone, but if business is slow, the consumers will find the iron already ordered will be sufficient. The week past has seen very little call for spot or prompt deliveries, and only small sales were made. Interest in spot has fallen off in a marked degree.

We quote for last quarter deliveries as follows:

No. 1X Foundry	$23.75 to 24.00
No. 2X Foundry	23.00 to 23.50
No. 3 Foundry	22.75 to 23.00
No. 2 Plain	22.50 to 23.00
Malleable Bessemer	23.00 to 23.50
Gray Forge	22.00 to 22.50
Charcoal	27.00 to 27.50

Frank C. Skinner, chief of the classification division of the patent office, has resigned.

ST. LOUIS.

Fair Inquiry With Little Change in Quotations.

June 24.

Pig Iron.—There is some buying of No. 2 pig iron for shipment in third quarter at $21.00 to $21.50 Birmingham. The lowest prevailing price for last quarter, f. o. b. Birmingham, is $20, with very little iron to be had. Inquiries for third quarter, last quarter and all of last half are more numerous than they were for the week previous. The lower prices that have prevailed for immediate shipment have acted as an incentive for a few buyers to come into the market.

Iron for the first quarter and first half of 1908 can still be had at $18.50 for No. 2, f. o. b. Birmingham.

Our quotations, f. o. b. Birmingham, to which the freight of $3.75 is to be added, are as follows:

No. 1 Southern	$22.50 to 23.00
No. 2 Southern	22.00 to 22.50
No. 3 Southern	21.50 to 22.00
No. 4 Southern	21.00 to 21.50

Steel.—The St. Louis firms report no cessation in demand for steel, though no large deals were closed last week. Extensive levee improvements contemplated by the United States government along the Mississippi river, in what is known as the St. Francis district, south from Cairo, Ill., it is believed, will require large tonnage of steel rails for piles and trackage. A good demand is reported for light steel spikes, also for steel in general.

Coke.—The market is probably a little stiffer. Some smelter coke is offered at low prices, but quotations for 72-hour Connellsville, f. o. b. ovens, remains at $3.25 to $3.50 per ton. The freight to East St. Louis is $2.80, and to St. Louis, $2.90.

Old Material.—There is a slight decline in the markets, but St. Louis dealers have no fear that it will cause any material effect. The manufacturers are refusing to pay the present prices, and dealers are holding off. The mills, it is said, contemplate increasing prices for new rails, and as a consequence, relaying rails are higher.

Our quotations are as follows:

	GROSS TONS
Second-hand Relaying Rails, according to time of delivery	29.00 to 32.00
Steel rails (less than 3 feet)	$17.00
Car wheels	24.00
Iron rails	24.50
Rerolling steel rails	18.00
Heavy melting steel	17.50
Country steel mixed	16.00
	NET TONS
No. 1 R. R. wrought	$16.50
No. 2 R. R. Wrought	15.50
Iron splice bars and fish plates	19.00
Iron car axles	24.60
Steel car axles	19.50
Locomotive tires, smooth inside	15.00
Iron shaftings (3 to 6 inches)	19.00
Country wrought	15.00
Pipes and flues	13.00
Heavy, machinery	19.00
R. R. cast (less than 300 pounds)	17.50
No. 1 Busheling	14.00
No. 2 Busheling	13.50
Boiler sheet and rings	13.00
R. R. cast borings (free of inferior quality)	10.50
R. R. wrought turnings	13.50
Machine shop turnings (free from brass)	12.00
Railroad malleable	16.50
Agricultural malleable	15.25
Cast stove plate	14.50

BIRMINGHAM, ALA.

Demand Not So Brisk, But No Uneasiness is Entertained.

June 24.

Though there is not so much activity in the pig iron market in this district as was noted a few weeks ago, it is asserted that no apprehension is felt as to the strength and tone. There is a little business going on and sales already booked for delivery during the balance of the year and later give encouragement to the manufacturers. Some of the producers in this section are still behind in deliveries, but this is accounted for in the fact that furnaces which are under repairs now were figured on to be in blast when the business was accepted. Smaller consumers who practically buy from hand to mouth are still placing orders and the larger consumers are making inquiries, preparing, it would appear, to take care of their future needs. The home consumption is heavy. With the exception of at the rolling mills, there are no indications of any let up in the melt in this district in the near future. The cast iron pipe makers, the larger consumers of iron, have a strong line of orders on their books and will continue active operations for some time to come.

Quotations for pig iron are the same as have been in vogue for some weeks now. Third quarter iron for this year is far from being easy to secure. Fourth quarter iron is being sold in small lots while a few sales are still reported for first half delivery next year. The third quarter iron of this year is quoted on a basis of $22.50 per ton, No. 2 foundry, while fourth quarter is given at $21.50. First half of next year iron sells at $18.50.

The production in Alabama will show considerable improvement by the last of the coming month.

BRITISH IRON MARKET.

Pig Iron Very Unsettled Owing to American and German Reports.

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., June 12.

The British pig iron market has been decidedly unsettled during the past week, prices having varied in Cleveland from 62s 6d ($15.30) a week ago to 58s 3d ($14.26.) Yesterday there was a recovery of about 8d, and today's quotations were 58s 11d ($14.42). The falling off during the week has been mainly due to quieter American advices, and a report extensively circulated that the boom in Germany will soon be over. But it is believed that these fluctuations are in reality due to speculative influences, and enormous quantities of iron are still being sent away. For example, on Friday last, 11,000 tons were sent to America, out of the record day's shipments of 21,000. The shipments of pig iron from the Tees during May reached 171,000 tons, and the warrant stock declined 78,600 tons, which exceeds any previous reduction. On Monday the amount in store was 307,430 tons. Reports from Barrow-in-Furness show a reduction on the week of 1807 tons, which now total 28,103 tons, while makers' stocks are practically nil. Smelters in Nottingham, Northampton, and Derbyshire have several months' work in prospect. The large demand by foundries is strengthening cold blast iron, and it is likely that this well known Staffordshire brand may shortly be increased.

METAL MARKET.

NEW YORK.

June 25.

Copper.—There is practically no change to report in the market. As for many weeks past, consumers are still waiting for the much-discussed reduction in the "official" price, or, if compelled to purchase, are taking only moderate tonnages at prices well below these figures. The tendency is downward and still lower prices may be expected to prevail. Actual quotations are still largely nominal in character, but the range is about as follows: Lake, 23½ to 24½c; electrolytic, 22½c to 23c; casting, 21c to 22c. The London market has slumped heavily during the week, closing yesterday at £94 for spot and £89 10s for futures.

Pig Tin.—Something has been lost of the London advance reported a week ago and there is only moderate activity in the local market, though reports are current of some important sales of spot metal. For early shipment the current quotation is 42½c to 43c, while for futures the price ranges down to 39½c. London closed yesterday at £187 15s for spot and £179 5s for three months.

Pig Lead.—Quotations continue on the level of a week ago, 5.75c for New York June delivery and 5.65c for soft Missouri spot. A record price for soft Spanish was made during the week, when sales were made in the London market at £22, this resulting from a

corner in June delivery, but yesterday's close was lower, £20 5s.

Spelter.—Hand to mouth buying has brought about slightly lower prices, as follows: 6.35c to 6.45c, New York, and 6.25c to 6.30c St. Louis. G. M. B. closed yesterday at £24 7s 6d.

Antimony.—Despite low quotations resulting from the recent heavy drop, the market is quiet. Cookson's is nominal at 16c and Hallett's at 13c to 14c.

CHICAGO.

June 24.

No change in prices of new metals was made during the week. Business was light and purchases were made only in small lots.

Copper lake sold for 26c and casting between 24c and 24½c. Sheet zinc was quoted at 8.60c La Salle in car lots of 100-pound casks. Spelter remained at 7¼c. Pig tin varied between 45¼c and 45½c. Lead desilverized sold for 6.10c and 6.20c in 50-ton lots and corroding for 6.80c and 7c. The price in car lots was 2½c per 100 pounds higher. Cookson's antimony was quoted at 24c and 25c; other grades at 23c.

The second-hand metal market was quiet and few sales were made. Salesmen reported conditions the same throughout the west. Buyers' prices quoted were

Copper wire, 18c; copper, heavy, 17.50c to 18c; copper bottoms, 16½c to 17c; copper clips, 16½c to 18c; red brass, heavy, 16c; yellow brass, heavy, 13.50c; red brass, borings, 14c to 15c; yellow brass, borings, 12.50c; light brass, 10.50c to 11c; zinc, 4.50c to 5c; pipe lead, 5c; tea lead, 4.50c to 4.75c; tinfoil, 31c to 32c; pewter No. 1, 28c to 29c.

ST. LOUIS.

July 24.

Lead and Zinc.—The highest price paid for zinc last week was $51 per ton, with the base price ranging from $46 to $48 per ton of 60 per cent zinc.

In some quarters the output was lowered, unexpectedly, and during the middle of the week, an advance of $1 was in sight. Practically all of the stock in the bins has been sold.

Buyers are taking the output each week, which amounts to about 6,300 tons.

The highest price reported to have been paid for lead was $74 per ton, ranging down to $72 for the lowest grades. The demand was weak, and the sales at the latter figure were better. Some producers believe that the market will assume a better tone after the middle of July.

CUYUNA MINES

Acquired By Duluth Capitalists By Purchase and Option.

(Special Correspondence.)

Duluth, June 25.—George H. Crosby and William Harrison, of Duluth, have purchased from Carl G. Carlson, of Spokane, lot 6 in section 29, 47, 28 on the Cuyuna range. The southeast quarter of the same section was also purchased. The property adjoins that just leased by the Rogers Brown Ore Co. and the consideration was $35,000. It is located on the south shore of Rabbitt lake and is in a territory where a considerable quantity of iron has been found, particularly by the Steel Corporation which drilled there last year. The property was bought to hold for future leasing.

The details of the option for lease taken by Coates and Miller on the southwest quarter of the southwest quarter of section 11 and the northwest of the northwest of section 14 in 57, 21 have been made public. The bonus was $55,000, with a royalty of 60 cents a ton. The term of the lease is 45 years. The minimums require the mining of 100,000 tons during the first two years and 100,000 tons each year thereafter. This is the property about which so many exaggerated reports have been published. Up to date 6,000,000 tons of ore, approximately half of which is Bessemer grade, have been shown up. It is understood that the present lessees will mine the ore.

AN EXCELLENT SHOWING.

(Special Telegram.)

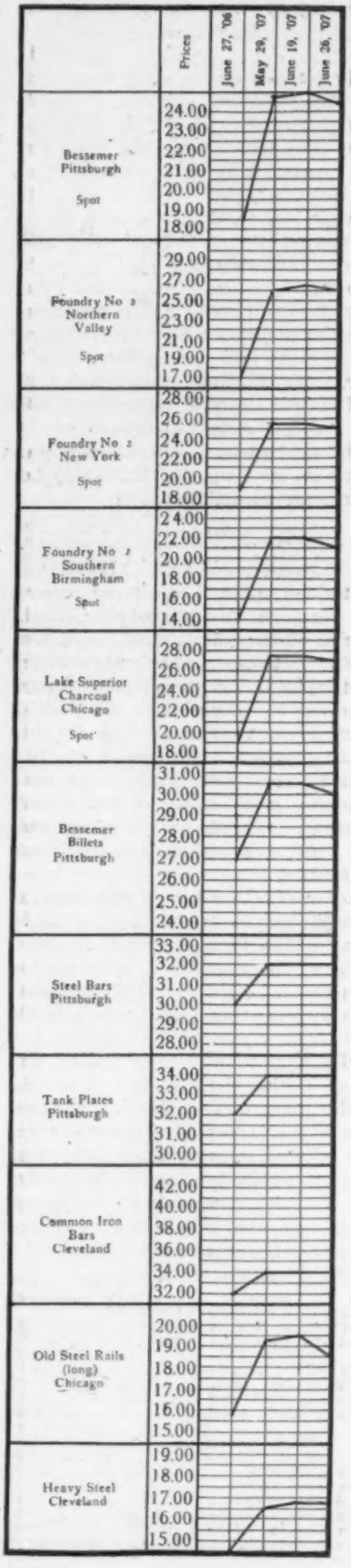
New York, June 26.—For the fiscal year ending with May last the Dominion Iron & Steel Co. reports net earnings of $1,563,152 against $711,774 the previous year. This excellent showing wiped out the deficit carried from past years.

The plant of the Utica Drop Forge Co., Utica, N. Y., burned Tuesday with an estimated loss of $200,000, covered by insurance.

T. H. Brooks & Co., Cleveland, have been awarded the contract to furnish and erect 1,000 tons of structural material for the new First National Bank building, to be erected in that city. The Jones & Laughlin Steel Co. will supply the steel for the work.

All the railroads in the United States, reporting for the two weeks of June, showed gross earnings of $14,949,662, an increase of $1,857,972, or 14.2 per cent over the corresponding period of last year.

PRICE CHART.



PERSONALS.

A. A. Fowler, of Rogers, Brown & Co., New York, has returned from a two months' stay abroad.

James C. Wallace, of Cleveland, president of the American Ship Building Co., has sailed for a three months' trip to Europe.

Herbert B. Atha, vice president and general manager of the Atha Steel Castings Co., Newark, N. J., is spending his vacation in Europe.

Lester P. Churchill, treasurer of the Vandyke-Churchill Co., New York, has sailed for a three months' vacation trip to various European cities.

H. A. McMore, engineer, formerly with the Harlem Contracting Co., New York, has been engaged by the General Fireproofing Co., Youngstown, O., and will be connected with the reinforced concrete department.

Harry Thomas, who has been in employ of the company in the past, has been elected secretary and treasurer of the Capital Lock Nut & Washer Co., Columbus, O., the two offices having been combined.

A. G. Judd has been elected secretary, treasurer and general manager of the Automatic Press Co., Warren, O., to succeed the late W. H. Smiley, of Niles. Mr. Judd also takes Mr. Smiley's place as a director.

A. A. Lane, engineer, connected with the Taylor-Wilson Mfg. Co., Pittsburg, for several years past, has been engaged by the General Fireproofing Co., as office manager of the reinforced concrete department at Youngstown, O.

John J. Hill, assistant general manager of the Struthers, O., plant of the American Sheet & Tin Plate Co., has resigned after many years in the service of the company. Henry Reomer is temporarily filling Mr. Hill's place.

Andrew Carnegie and Joseph Wharton, president of the American Iron & Steel Association, accompanied by Mrs. Carnegie and Mrs. Wharton, were the guests of Ambassador Tower during the festivities at Kiel, Germany, during the past week and were presented to Emperor William.

The resignation of Gen. William F. Draper, president of the Draper Co., Hopedale, Mass., will take effect July 1. No successor will be selected until after that date. A desire to give up business detail at a convenient opportunity led to Gen. Draper's resignation.

I. A. Brown has returned to the Ohio works of the Carnegie Steel Co., Youngstown, and assumed his former position as superintendent of labor and transportation vice I. B. Stickney, resigned. For about one year past Mr. Brown has been connected with the new Aliquippa works of the Jones & Laughlin Steel Co.

Charles Brock, president of the Boonton Iron & Steel Co., Boonton, N. J., has been made president and general manager of the Susquehanna Iron Co., successor of the Susquehanna Iron & Steel Co. Michael Blake, vice president of the Manhattan Rolling Mill and of the firm of John Leonard & Co., New York, has been made vice president and treasurer of the reorganized company.

Joseph Wharton, chairman of the board of managers of Swarthmore College, was referred to in the course of commencement exercises at that institution by one of the speakers as follows: "He especially refutes the theory held by Dr. Osler that a man is no longer serviceable after the age of sixty. He retains his wonderful vigor by means of physical exercise, a modern custom among older men that our fathers would have marveled at, particularly had they seen, for example, Joseph Wharton playing tennis at the age of eighty."

DISTRIBUTES BONUS TO EMPLOYES.

The ninth semi-annual bonus distribution at the Remington Standard Typewriter factory, Ilion, N. Y., owned by Wyckoff, Seamans & Benedict, took place in the factory hall, June 21. The sum of $14,450 in gold was divided among 289 persons. This number out of 1,700 employes had worked from 10 to 34 years continuously with the company and had qualified as well on the score of diligence and efficiency. The list included three 34-year men, eleven 25-year, thirty-six 20-year, ninety-four 15-year, and a hundred and forty-five 10-year men.

EMPLOYES RECEIVING BONUS FROM THE MANUFACTURERS OF THE REMINGTON TYPEWRITER.

Will Build Furnaces.—The Cleveland Furnace Co. has begun work upon the foundation for the new stack which it will add to its Cleveland plant. Announcement of the decision of the company to construct the second stack was made in THE IRON TRADE REVIEW, Sept. 21, 1905. The new furnace will be somewhat larger than the present one, and its product will be malleable, basic and Bessemer iron. The Detroit Iron & Steel Co. will begin at once the erection of a second stack at its Detroit plant.

Arthur Amos Noyes, Ph. D., professor of theoretical chemistry and director of the research laboratory of physical chemistry at the Massachusetts Institute of Technology, Boston, is to be named by the executive committee to act as president of the institute till the vacancy caused by the resignation of President Henry S. Pritchett on July 1 is permanently filled. Prof. Noyes is 41 years old, a member of the National Academy of Sciences, and an author of many works, especially along the lines of chemical research.

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THE TIN AND SHEET WAGE SETTLEMENTS.

The settlement last week of the sheet and tin plate wage scales for the twelve months beginning July 1 is an evidence of the conservatism of the Amalgamated Association, and also of the willingness of the leading interest to treat its employes fairly.

Except for the most minor modifications in some conditions, the settlement involves an adoption of the previous scales for another year. On the tin plate scale the Amalgamated Association convention had adopted demands for various advances on the different jobs which involved an average advance of 9½ per cent on the whole scale. In sheets it had recommended a change for the day hands to a tonnage scale formulated to carry out this plan involving an advance for these men of about 4 per cent.

The demand for an advance in the tin plate scale was not taken seriously, but the conference proceeded on the lines of allowing the men to present all their claims as fully as they desired, after which the representatives of the American Sheet & Tin Plate Co. briefly stated their position. The settlement then hinged upon the position laid down by the company, that inasmuch as the existing scale ran only through June 30, a passing of that date without a settlement would be interpreted as declaring everything off, so that the company would then proceed upon its own lines. Doubtless the men drew unfavorable auguries from this position. In all probability they would have been willing to enter into an arrangement whereby the mills should continue at work under the old scale, pending a settlement, but the leading interest has always been opposed to such straddles.

The proposition for a straight tonnage basis for all sheet mill labor was originally fathered by the independent sheet mills, and has much to commend it. While the proposed scale involved some advance, the workmen would probably have been willing to refigure it to conform more closely to the existing scale, but the leading interest did not prosecute this line. The settlement on the old scale is more or less of a disappointment to the independent sheet manufacturers, and the point is brought out, as it has been before in such wage scale adjustments, that the interests of the leading company and of the independents are not invariably identical.

The tin plate and sheet scales are very fair to the workmen, simply from the standpoint of compensation for ordinarily skilled labor. The work, however, is very arduous from a physical standpoint. The tendency of the age has been to make less desirable those employments which involve what are regarded as physical hardships, and this has maintained rolling mills wages where under different views there might have been more desire for employment in this trade, and lower wages.

The actual earnings in tin mills have undergone but slight change since the industry was founded some fifteen years ago, although there have been great changes in wage scales and conditions of work. The rate per ton suffered a great reduction after the passage of the Wilson law in 1894. Later there was an advance, and then a reduction, followed by advances making the scale from July 1, 1900, to April 1, 1904, the highest on record. Then came a heavy reduction, in April, 1904, but three months later the limit of output, which had twice been increased, was entirely removed. As a result of this removal, coupled with the fact that equipment and processes have been greatly improved, the earnings per job are much greater, with somewhat lower tonnage rates, than they were before the Wilson wage reduction. On the other hand, the work has become more arduous and it is the practice for the hardest worked men in the crew to employ helpers. As a result of all these changes their earnings per week, and the actual labor they must perform, are but little different from the conditions of fifteen years ago.

Below is given a table we have compiled showing the tin plate scales from the earliest time to the present. The rates given are the total pay of the hot mill crew, including the shearman. In the earlier scales the screwboy and shearman were paid day rates, and these have been estimated upon tonnage rates, the totals given in the table therefore showing the total wage cost of heating, rolling and shearing a ton of 2,240 pounds of black plate. The jobs included are heating, rolling, catching, doubling, operating the screw and shearing. The base of the scale is also given. At first the basis was a 1½-cent iron card; afterwards it was changed to a ratio between the selling price of tin plates and of steel billets, first at one-fourth and afterwards at one-fifth. Finally, the scale was based upon the ascertained average selling price of tin plate in bi-monthly periods. Wages advance 2 per cent for each 10 cents advance above the base in actual realized prices of tin plate shipments. The limit of output in pounds per turn is given. The prices and limits refer to 30 gage, which makes 100-pound and 108-pound plates:

Tin Mill Scales, 30 Gage.

Scale, year.	Price, 2,240 lbs.	Base.	Output limit.
1894-5	$11.28	1½c	5,250
1894-5*	9.78	1½c	5,250
1895-6	11.23	R.¼	5,250
1896-7	11.23	R.1-5	5,250
1897-8	10.61	R.1-5	5,250
1898-9	10.61	R.1-5	5,250
1899-00	12.24	$4.25	5,750
1900-1	12.24	$4.20	5,750
1901-2	12.37	$4.20	5,750
1902-3	12.37	$4.20	6,250
1903-4	12.37	$4.20	6,250
1904-5†	10.25	$3.40	6,250
1905-6-7	10.25	$3.40	None.

*This scale adopted in January, 1895, after strike or lockout following passage of Wilson bill.
†This scale first adopted in April, 1904.

The tin plate workmen are now receiving 6 per cent above the base rates, on account of the sliding feature of the scale. The manufacturers contend that this advance is due entirely to the high price of pig tin, as it has been selling at 20 cents or more a pound higher than the market prevailing, or expected, at the time the base of the tin plate scale was fixed at $3.40. This has increased the cost of making tin plate by 40 cents a box or more, while the wage advance is paid because tin plate has realized 30 cents a box above the scale base. While the workmen must admit that this is true, they assert that these prosperous times should give them an advance, if they can ever expect one. The fact is that in all Amalgamated Association wage scales, except perhaps in the recent past in the bar iron scale, the base has been too high, and has been so because the workmen demanded such conditions that the manufacturers had to trade them off for a high base rate.

AN IMPORTANT STEEL RAIL DISCUSSION.

Notwithstanding the claim of inspecting engineers of some of the leading trunk lines that the rapid increase in the number of rail breakages is due to inferior steel and insufficient rolling of the sections, no data were offered which would bear out this contention, in a discussion of this subject at the annual meeting of the American Society for Testing Materials, held last week.

On the contrary, statements made by the railroad representatives indicate that the weight of rolling stock is excessive for even the heaviest section as at present designed, nor has the increase in the weight of the section been proportionate to that of the locomotives and cars in recent years. The statement was made that 85 per cent has been added to the weight of engines and on the drivers since 1885, yet during that period the increase in the weight of the rail sections would barely average 30 per cent.

Considerable evidence was also offered which would indicate that many failures result from the operation of locomotives that are not properly counterbalanced and flat spots on drivers likewise produce many fractures. Investigation of some 50 breakages on a western road conducted by a non-interested party showed that all of the broken rails were taken from one side of the track and it was found that the locomotives on this division, which had a slight grade, had a tendency to swerve toward this side. Steel tie plates, it was believed, also were a contributing factor, as many of the failures occurred immediately over them. Analyses to ascertain the chemical properties of eight of these rails showed them to be normal, and the elements were all well within the specified limits.

The numerous suggestions offered to overcome this difficulty showed a wide difference of opinion, among not only the rail makers, but the railroad engineers as well. That a change in the design of the section might materially aid in the solution of the problem was generally admitted, but the railroad interests hesitate in the adoption of a section above the present limit in weight. It was pointed out that the design of the American rail section does not admit of sufficient manipulation of the steel due to the large mass of metal in the head which carries the heat longer than the much thinner web and flanges, the head consequently not being rolled at a sufficiently low temperature. A section having the same width of head as the present 100-pound rail, designed by the American Society of Civil Engineers, having sufficient metal in the web and flange to carry enough heat to allow the head to be finished at a lower temperature would, according to one of the speakers, have a weight ranging from 120 to 125 pounds to the yard.

Driving wheel weights have increased up to 30,000 pounds per wheel, and the crushing tendency of such loads is undoubtedly greater than the steel used in the manufacture of rails, and as specified by the railroad interests themselves, can withstand. One eastern road is reported to have prepared new specifications which none of the rail makers is inclined to meet at the prevailing quotations. Until a satisfactory price is reached, no contracts will be awarded for 1908 requirements, and the outcome is awaited with interest by the other railroad interests that are considering radical changes in their specifications.

Battleship Bids Low.—Comparatively low figures have been quoted by ship builders to the national government for the construction of the proposed large battleships Nos. 28 and 29, each of which is to be approximately 20,000 tons displacement. There was provided by congress $6,000,000 each for the hull and machinery of the battleships, with about $4,000,000 for armor and armament, and according to the bids submitted it is believed that the cost will be well within the appropriation. Bids for supplying armor for the two ships, which were also opened, showed the following lowest bidders: Midvale Steel Co., $410 per ton for 7,956 tons of class A; Carnegie Steel Co. and the Bethlehem Steel Co., each $400 per ton for 952 tons of class B; Carnegie Steel Co. and the Bethlehem Steel Co., each $400 per ton for 392 tons of class C., and the Bethlehem Steel Co., $400 per ton for 1,075 tons of class D.

Catalogs Wanted.—The department of mechanical engineering practice of the Carnegie Technical Schools is starting a catalog file and requests manufacturers of machinery to send their catalogs in care of Prof. Trinks, Carnegie Technical Schools, Pittsburg, Pa. Complete information is desired on all lines of mechanical work from boilers and engines to automatic and special machinery.

J. H. Plummer, president of the Dominion Iron & Steel Co., Sydney, N. S.; William Mackenzie, president of the Canadian Northern railway; and Frederic Nicholls, of Toronto, returned this week from Europe. Mr. Nicholls' trip extended to Berlin and was undertaken to secure for the Canadian General Electric Co. from the Allegemaine Elektrictatz Gesellschaft, rights to the latest improvements in electric mechanism held by the German enterprise.

INDUSTRIAL CONCERNS

Come Into Market for Machine Tools. —General Inquiry is Good.

Office of THE IRON TRADE REVIEW,
Room 1005, No. 90 West St.,
New York, June 25.

Although the past week has developed no railway lists of consequence, three industrial concerns have come into the market for machine tools aggregating between $25,000 and $30,000 in each instance and the general run of smaller inquiry has been such as to give basis for the belief that the much discussed letting down in business is either not yet at hand or is not to be of important proportions. Some very attractive railway work is pending, in addition to the purchases made a fortnight ago, the most important of these being by the Seaboard Air Line and the Norfolk & Western. A number of important construction projects are shortly to be begun, in spite of the fact that the arrival of summer weather usually marks the end of this movement. A particularly heavy demand is noted for milling machines and lathes, and in all lines little improvement is noted so far as deliveries are concerned. Splendid results are reported from the railway meetings just closed at Atlantic City.

The properties recently purchased at receiver's sale by Michael Blake and associates are to be operated by a company now forming with the name of the Susquehanna Iron Co. This will have a capitalization of $500,000. Its president will be Charles Brock, who will also act as general manager, and Mr. Blake will be vice president and treasurer. Mr. Brock is president of the Boonton Iron & Steel Co., operating bar iron and angle mills at Boonton, N. J. Mr. Blake is vice president of the Manhattan Rolling Mill, Inc., and is connected with various other iron and steel concerns in addition to his interest in the firm of John Leonard & Co., 149 Broadway. He states that but little will be needed in the way of new equipment, as the plants were bought as "running" propositions. Some shearing machinery may be required in the early future and eventually the properties, which include skelp, bar and pipe mills, may be considerably enlarged. Two blast furnaces, which have been idle for four years, are now being put in shape for operation.

With a capitalization of $125,000, the concern of Vermilye & Co., 17 Battery Place, has been incorporated. Eventually it will succeed to the business heretofore carried on under the firm name of Vermilye & Power, who have an office at this address for handling heavy machinery and hardware, with a specialty of railway, canal and naval work. Existing contracts include a number with the government for canal and naval supplies and these will be carried out under the old name. Officers have not yet been chosen, but it is probable they will be as follows: F. M. Vermilye, president; A. C. Saportas, vice president; Frank Paul, secretary.

The Pratt & Whitney Co., Hartford, Conn., which some time ago completed construction work on a six-story addition to its machine shops, has installed the necessary machinery and is now occupying the entire structure, which adds nearly 140,000 feet of floor space to its manufacturing facilities. This addition was planned chiefly to relieve congested conditions in the older buildings, with which it is connected by bridges. One floor is occupied for office purposes. A new foundry building is also in use.

The Chicago Pneumatic Tool Co. is now taking over the Grant Tool Works, Franklin, Pa., which were recently acquired to take care of the company's increasing business in air compressors. The Grant works made a specialty of turret lathes and other heavy machinery, but hereafter will be devoted exclusively to the manufacture of compressors as the Chicago company's present plant at Franklin has been entirely outgrown.

MACHINERY SALES LIGHT.

(Special Correspondence.)

Chicago, June 25.—Lighter sales in all lines of machinery and tools were the rule in the Chicago market during the past week. The decrease which became noticeably apparent about May 1 has been felt more as the season advanced, and the hot weather of the past week seems to have affected the buying largely. Inquiries in all lines have dropped and have almost ceased from small shops. Railroad buying also has been light.

Local salesmen who visited the offices of the Seaboard Air Line during the past week to inquire concerning the placing of the large machine list sent out, learned that orders for a large number of machines will not be placed and the orders to be closed will be much smaller than the original specifications.

Mumford Machines.—In the descriptive article on the plant of the Russel Wheel & Foundry Co., published in THE IRON TRADE REVIEW of June 20, the fact that the four latest molding machines purchased by the Detroit company were Mumford machines was unintentionally omitted.

OBITUARIES.

John L. King, a director of the Detroit Iron & Steel Co., died recently at his home in Syracuse, N. Y. He was general counsel for the Solvay Process Co.

Charles Francis Cripps died at his home recently in Philadelphia at the age of 79 years. He was a retired file manufacturer and was widely known as a philanthropist.

Marinus L. Vanderkloot, for seven years vice president of the South Halstead Iron Works, Chicago, died at his home in Wilmette, Ill., June 17, from a stroke of apoplexy at the age of 41.

Thomas McCosh, founder and for many years manager of the McCosh Iron & Steel Co., Burlington, Ia., manufacturing barb wire and wire nails, died June 6 in that city at the age of 76. He was at one time quite prominent in Mississippi valley trade circles.

William Le Baron Jenney, a noted architect and one of the pioneers in building the steel skeleton style of skyscraper, died June 15 at Los Angeles, where he had lived since he retired in 1905 from the Chicago firm of Jenney, Mundie & Jensen. Mr. Jenney gained renown in 1883 by successfully completing the Home Insurance building, Adams and La Salle streets, Chicago, which is said to be the first steel frame structure of its kind ever constructed.

William Findlay Shunk, widely noted as a railway engineer, died June 22 at his home near Harrisburg, Pa., to which he had retired about five years ago. His chief achievements were the building of the Sixth avenue elevated railway in New York and of the Southern Pennsylvania Railway, the completion of the Kings county elevated railway in Brooklyn and the direction of the building of the Guayaquil & Quito railroad which crosses the Andes and is said to be the highest in the world

Club House Opened.—The new club house of the Cleveland Manufacturers' Club on East Fortieth street, in that city, has been formally opened and dedicated to the use of its membership. On the occasion of the opening, the club was tastefully decorated with floral designs and with its new furnishings presented an attractive appearance to the guests who attended the reception.

Charles D. Fraser, secretary of the Oliver Iron Mining Co., New York, sailed Wednesday for a vacation trip abroad.

UNION MINERS

Disagree With Employers in Alabama. —Labor Notes.

Birmingham, Ala., June 24.—A disagreement has taken place between the commercial coal operators and the United Mine Workers of America. Less than 3,000 union miners are now employed by the commercial operators, several of the coal companies and the larger iron and steel companies not recognizing the union miners. The commercial coal operators have offered a renewal of the wage contract which has been in effect for several years as far as the price of mining goes, but in order that the competition of the non-union mines can be met the operators ask that concessions be made in the way of a monthly pay day instead of semi-monthly and that each miner be allowed a laborer in the mines. The miners before adjourning sine die the past week, referred the matter to their district officers, but adopted resolutions strenuously objecting to allowing the concession as to the day laborer with each miner and the monthly pay day will be a matter for argument at the various camps. The commercial coal operators insist on the concessions. The present contract expires July 1. The Alabama Consolidated Coal & Iron Co., employing less than 1,000 miners, has signed the wage contract with the union. This is the only concern that has taken such steps.

Cleveland Strike Ended.

The strike of the Cleveland machinists, who demanded a nine-hour day and a 10 per cent increase in wages, has ended in a complete victory for the employers, particularly those included in the membership of the Cleveland branch of the National Metal Trades Association. The shops of all the members, except the Long Arm System Co., where the strike is still unsettled, are now operating to full capacity, the men having returned to work under the conditions existing before the trouble. The one member of the Metal Trades Association who granted the demand for a nine-hour day has since reconsidered the action and has placed the shop on the former 10-hour basis. The membership of the Cleveland branch of the Metal Trades Association has been considerably augmented by the joining of new firms since the trouble began.

Blanket Injunction Allowed.

A blanket injunction, preventing strikers from assembling and molesting strike-breakers, has been granted by the circuit court of Detroit to the Employers' Association of that city. The complainants in the case were the American Lubricator Co., Capitol Brass Works, American Brass & Iron Co., Detroit Brass Works, Detroit Lubricator Co., Detroit Sanitary Supply Co., McRae & Roberts, Michigan Lubricator Co., Penberthy Injector Co., Roberts Brass Mfg. Co., Standard Brass Works, Standard Sanitary Mfg. Co., Sterling & Skinner Mfg. Co. and the Detroit Ship Building Co. The defendants were the metal polishers', buffers' and platers' organizations and a number of individual union men.

Labor Notes.

The feature of the lake ship yard strike during the week has been the further return to work of striking gangs, a movement which has marked the progress of the strike for the past three or four weeks. The Lorain and Wyandotte yards, are now completely in operation.

The refusal of the Harbison-Walker Refractories Co. to grant the demands for an increase in wages resulted in the walk-out of 135 men of the Portsmouth, O., plant, June 20.

An agreement has been reached by the plant owners and the iron molders' organization in the Mahoning valley on the 1907 and 1908 wage scale. The foundrymen granted an increase of 10 cents a day on the consideration that the minimum rates of $3.20 for molders and $3.05 for core makers be unchanged and the plan to secure the Pittsburg scale of $3.50 be abandoned. The agreement finally signed provides for a change in the minimum wage of only one plant where an advance of 10 cents a day was granted.

Plant Well Managed.—The creditors' committee, appointed in behalf of the creditors to examine the affairs of the Consolidated Mfg. Co., Toledo, reports it has found that the receiver is conducting the business in a careful and businesslike manner and that it is unable to make any criticism. The financial side of the business, it is declared, is being well taken care of and of the $105,000 originally borrowed by the receiver to carry on the business, but $60,000 remains outstanding. It is recommended by the committee that the receiver be authorized to continue the business for one year from Sept. 1, 1907, believing the showing this year fully justifies such a course. The forging department of the plant has been considerably enlarged, and the management is now paying particular attention to custom work. Four more forge hammers have been added to the equipment.

INDORSES STEEL FRAMES.

Steel frame construction is characterized as the best type of building work now in use, by Capt. John S. Sewall, engineer corps, U. S. A., in reporting on the lessons to be drawn from the conflagration of San Francisco. Immediately after the great catastrophe Capt. Sewall and other technical experts were commissioned by the government to investigate the damage done and to ascertain the effect of the fire on the various grades of construction. "The best type of construction is undoubtedly a steel frame," says Capt. Sewell in his report. "For buildings of moderate height, say up to 125 feet as an extreme limit, reinforced concrete alone can undoubtedly be so designed as to give very good results when subjected to either earthquake or fire. Metal trim windows, sash and casings, together with plate glass, or better, wire glass, may confine a fire to a single room, preventing a general combustion."

Celebrates Centennial.—June 16, 1907, marked the 100th anniversary of the establishment of the Townsend Furnace & Machine Shop Co., of Albany, N. Y., one of the leading industries of that city. The existence of the plant, which now presents an interesting story of successful administration and achievements, dates from 1807, when Isaiah and John Townsend, wholesale tin plate, bar iron and steel merchants, founded what they termed the "Albany Air Furnace." Throughout all these years the term furnace has remained a part of the company's corporate title. The business has undergone successive stages of expansion until its centennial finds it located in a large modern plant and its products of power transmitting machinery, mill gearing, steam dredges, hoisting machinery, etc., favorably known in all parts of the world.

Bethlehem Notes Sold.—The Bethlehem Steel Co. has disposed of an issue of $2,500,000 of 6 per cent five-year guaranteed notes, and the funds will be used in completing the erection and equipment of the new rail and structural steel plant at South Bethlehem, Pa. The notes of the company, which were guaranteed by the Bethlehem Steel Corporation, were taken by a syndicate and private investors at 94½.

During the month of May the Allis-Chalmers Co. shipped from its works 553 cars of machinery, which was a gain of 20 cars over the record established for April. The aggregate weight of April shipments was 21,680,847 pounds.

BUSH FIRES

Prevail on the Mesabi.—Shipments Continue at Rapid Rate.

Office of THE IRON TRADE REVIEW,
411 Providence Bldg.,
Duluth, June 24.

Bush fires have been very prevalent on the range this week, but they are not unexpected, and the mining locations are little likely to be affected. Shipments continue at the same rapid rate, an instance of which was the shipping in one day from the Hull-Rust of 24,500 tons of ore. The only records that compare with this are some of those made at Mt. Iron in the past two years. While the figures from the docks do not indicate it, mining superintendents state that the strict regulation covering the size of chunks permissible for shipment from open pits is becoming an important factor in the quantity and cost of production. Furnace demands have been lately much more insistent in this regard and the latest instructions to the mines are that no chunks larger than will pass through a 5-inch ring may be shipped.

The observance of this ruling requires a large force of "chunk inspectors," it delays shipments to a marked degree, it is claimed, and in consequence runs up the cost of production. The Mesabi range deposits are more largely composed of chunks in the lower strata so that the older and deeper mines are the ones most affected, generally speaking.

The Scotch Iron Co. was incorporated during the past week by David L. Fairchild, H. H. Phelps, Thomas A. Merritt and James G. Vivian, all of Duluth. The above incorporators are, respectively: President, vice president, secretary and treasurer, and the company owns the southwest quarter of the northwest quarter of section 14, 58-19, adjoining the Kinney mine. The ore body of the Kinney mine extends over on this forty and a shaft is already down to a depth of 90 feet, the further development of which will be pushed at once. That part of the property which is not required for mining purposes will be laid out in lots. It is estimated that 60,000 tons of ore are already in sight, and the company is about to begin drifting.

At the Corsica mine near McKinley, Minn., a new shaft is being sunk and is down about forty feet. Instead of building a new shaft house, the one used for the old No. 1 Elba shaft will be moved over without dismantling it, as the hoisting from the Elba mine will be carried on hereafter from the new shaft built last year entirely. Moving a head frame this distance is a rather novel undertaking, but the contractor anticipates no difficulty.

The Biwabik mine, which in 1905 made its largest shipment, close to 1,100,000 tons, is perhaps one of the best examples of the policy of a number of independent mine owners having fairly good ore in their deposits. Last year, Biwabik shipped a little more than 800,000 tons and this year it will ship in the neighborhood of 600,000 tons, the decrease in output signifying the owners' belief that their ore is worth more to them in the ground than on the market, which points to a materially advanced price for high grade ore in the near future. Where possible just enough ore is being sold to take care of fixed charges and income. The Mahoning is another instance of the same policy. It is something of this feeling on the part of those now owning undeveloped Mesabi range property that is responsible for the high bonuses and royalties that are being asked. It would seem as though some of the prices asked were based on future values rather than present and regardless of accumulating charges against the investment in the meantime.

Another record will be broken by the Duluth, Missabe & Northern docks for June. Already these docks have shipped over 1,500,000 tons of ore since June 1 and by the end of the month will have exceeded the 2,000,000 ton mark. Boats have been plentiful during the past week and the prospect is good for the next few days. A large amount of coal continues to arrive. The ore shipment figures for the head of the lakes for the week June 14-21 were as follows: Duluth, 487,574 tons; Two Harbors, 337,759 tons, and Superior 285,212 tons, a total of 1,110,545 tons. During the same week a year ago Duluth shipped 357,960 tons, Two Harbors 290,801 tons and Superior 210,203 tons, a total of 858,964 tons or 251,581 tons less than this year. This year now has a margin of 1,395,044 tons over 1906.

Active Furnace Operation—The new No. 7 furnace of the Carrie group, Rankin, Pa., will be ready for the torch within the near future. No. 6, also new, was blown in June 5. Each is of 500-tons capacity, with the most modern equipment. But one of the Corporation furnaces is now out of blast, Mingo No. 4, and it will be ready to resume operations about July 10. This heavy percentage of operation is unusual for the summer months, but is not a record for the Corporation, as at one time during the past spring it had every furnace under its control in blast.

RAIL ORDERS PENDING.

(Special Telegram.)

New York, June 26.—Some important rail contracts are pending, but no large sales are reported. The leading interest reports some heavy sales of steel piling.

The local iron market is firm, but stagnant, No. 3 Middlesbrough opened today at 56 shillings nine pence.

CANADIAN NOTES.

(Special Correspondence.)

Toronto, June 25.—B. Bell & Son, Ltd., agricultural implement manufacturers, St. George, Ont., have assigned after a business career of fifty-two years. The cause given for failure is the building of a plant disproportionately large for the firm's business. The statement of affairs at a meeting held in Toronto on June 19, showed that assets amounted to $138,870 and the liabilities to $72,916.

The labor situation is a good deal improved. A strike of the boilermakers, who demanded a 9-hour day, was averted by a compromise, the employers agreeing to increase wages by 10 per cent in place of reducing the hours. The men now receive $3 per day instead of $2.75. The machinists' strike still continues in the principal establishments, but some of the smaller shops have conceded the men's demands.

Stockholders of the Tidewater Steel Co., Chester, Pa., have been notified by the reorganization committee that Cleveland parties have asked for an option on the stock at 75 cents a share. It is stated that certain large holders, including Dick Bros. & Co., have already given the option.

The two new factories for the P. & F. Corbin Co., New Britain, Conn., have been finished and are ready for occupancy. One is a four-story addition, 60 by 211, built as an extension to a two-story building, making it six stories, the other is a six-story building 48 x 60, with brass foundry on top floor.

Announcement is made that J. E. Sterrett, certified public accountant of Philadelphia and New York, has joined the firm of Jones, Caesar, Dickinson, Wilmot & Co., which will hereafter be conducted under the style of Dickinson, Wilmot & Sterrett. The offices of the firm will be at 925 Chestnut street, Philadelphia, in addition to those hitherto maintained.

IRON AND STEEL FOR RAILWAYS

FORMED AN IMPORTANT PART OF THE ATLANTIC CITY EXHIBITS.

Increase in Use of Steel Castings.—Great Extent of Brake Shoe Business.—Supply Men Organize.—Five Thousand Attend.

(Staff Correspondence.)

Atlantic City, Jan. 21.—Practically one-fourth of the 350 displays included in the exhibit of railway supply manufacturers, held on the steel pier, Atlantic City, June 12-19, in connection with the convention of the American Railway Master Mechanics' Association and the Master Car Builders, were made by concerns that cast or fabricate iron and steel equipment for railroad use. These displays indicated that the tonnage of freight and passenger car accessories alone is of immense proportions and that it must measure not unfavorably with the combined consumption of rails, and of plates and structural sections entering into the construction of steel cars. In reviewing the progress in the development of railway brake shoes, F. W. Sargent, before the Master Car Builders, placed the total consumption of all types of brake shoes by the railroads of the United States and Canada at 238,750 tons annually, a total far above the wildest estimates of the most sanguine brake shoe manufacturer.

The showing of various types of steel side and center sills, not only for freight but passenger cars as well, forecasts a still further substitution of steel for wooden sections and the pressed steel carlines exhibited for the first time, foreshadows the passing of the wooden roof supports for box cars.

Progress of Steel Foundries.

The displays of the steel foundries encompassed practically all of the sections required in the body construction of locomotives and cars and were mute evidence of the passing of gray iron and forged steel parts. The exhibits included cast steel couplers, knuckles, platforms, bolsters, side frames, driving wheel centers, locomotive frames, car wheels, etc.

The greatest triumph of the steel founder consisted of the cast steel wheel, shown by the American Steel Foundries, Chicago. One of the East St. Louis, Ill., plants of this company has been equipped for the manufacture of these wheels for commercial use, after a series of experiments covering a period of four years. In the casting of the wheel, the revolving mold principle for compressing the metal in the tread and flange is utilized, the mold revolving at a speed of approximately 600 revolutions per minute. As it requires about 15 seconds to cast, the mold is revolved 200 times in this period. Inasmuch as a green sand mold would break down at this speed, dried molds are used, which withstand the wash of the metal. The steel enters the mold under considerable pressure from a basin connected with the center gate, and in that portion of the metal required for the wearing surfaces, including the tread and the flange, manganese, in the form of powdered ferro-manganese, is introduced by a secret process. This results in the formation of practically a high manganese steel where the greatest strength and highest wearing qualities are required, while the web and hub, in whose metal no manganese is introduced, remains of a mild quality. The castings show no line of demarkation between the high manganese and other sections, the change being gradual as in the blending of the chilled and gray iron parts of the cast iron wheel. An important part of this process is the annealing which must be done carefully, so that the temper of the wearing surfaces remains unchanged. The castings are heated to a bright cherry color to relieve the internal strains and while cooling the tread and flange are sprayed with water to restore the temper that may have been lost in heating.

Wheels that can successfully withstand the tests to which 700-pound gray iron sections are subjected, weigh only 550 pounds, and this reduction in weight is a factor of prime importance in view of the tendency to constantly increase the weight of railroad rolling stock. Their cost at present is about double that of the gray iron wheel, and considerably less than the rolled and steel tired wheels.

Exhibit of Rolled Steel.

The exhibit of the rolled steel wheel made by the Schoen Steel Wheel Co., McKees Rocks, Pa., attracted considerable attention, as the process of manufacture was shown in the various stages by the unfinished banks. That considerable thought is being given to the construction of car wheels by processes other than pursued by the gray iron foundry for nearly half a century was indicated by these displays, and the Standard Steel Car Co., Pittsburg, is about to begin experiments at its Butler, Pa., plant with a view to producing a forged wheel for both freight and passenger service.

Practically one entire session of the meeting of the Master Car Builders was devoted to a discussion of cast iron car wheels, the makers having recommended the adoption of a standard size for the different capacity cars, which would not only be interchangeable, but which would permit the car wheel makers to carry a stock from which orders could be filled more promptly than at present, owing to the varying specifications of the various roads. The question of increasing the thickness of the flange owing to the numerous failures of wheels at this point brought a request from the car wheel founders that the weights of the wheels be increased 15 pounds to cover the increased metal required. No definite action was, however, taken on these suggestions, or the recommendations of the car wheel committee, a letter ballot being decided upon to permit all of the members to voice their sentiments.

Regarding the extent of the brake shoe business in this country and Canada, and the heavy annual consumption, F. W. Sargent spoke as follows:

The Brake Shoe Business.

There are in use in the United States and Canada on steam railroads approximately 50,000 locomotives, 55,000 passenger coaches, and 2,000,000 freight cars.

On the basis of an average equipment for each, we have:

On locomotives, 6 shoes, 50 pounds each, 300 pounds.
On tenders, 8 shoes, 25 pounds each, 200 pounds.
On sleeping cars, 12 shoes, 25 pounds each, 300 pounds.
On coaches, 8 shoes, 25 pounds each, 200 pounds.
On freight cars, 8 shoes, 20 pounds each, 160 pounds.

With these figures, the amount of material for a single equipment amounts to 178,250 tons, divided as follows: On locomotives, 7,500 tons; tenders, 5,000 tons; coaches, 5,950 tons; freight cars, 160,000 tons.

To supply one outfit of brake shoes for this railway equipment would con-

sume the total output of a foundry manufacturing 600 tons of castings per day for one year.

If we assume as the average yearly consumption of brake shoes: 4 sets of shoes per locomotive, 4 sets of shoes per tender, 5 sets of shoes per coach, 1 set of shoes per freight car, we have as a total yearly consumption of brake shoes: Locomotives, 30,000 tons; tenders, 20,000 tons; coaches, 28,750 tons; freight cars, 160,000 tons; a grand total of 238,750 tons.

At an average price of $60 per ton for driver shoes, $40 per ton for coach and tender shoes, and $30 per ton for freight car shoes, the total cost per year for brake shoes with the equipment noted becomes: Locomotives, $1,800,000; tenders, $800,000; coaches, $1,150,000; freight cars, $4,800,000; or a grand total of $8,550,000 for the first cost of brake shoes used, which gives an average cost of $23,425 per day for 654 tons of material purchased per day.

On this amount, however, there is a rebate because of the scrap returns, which has a high market value and materially reduces the actual costs.

The average scrap weight of brake shoes is about 50 per cent of the original weight, and at a cost of $14 per ton we would have 119,375 tons of scrap at $14 equals $1,671,250, which will reduce the cost of brake shoes per year to $6,878,750, or an average expense of $18,846 per day.

This figure is merely an approximation to show, in a measure, the extent of the brake shoe business.

Large Attendance.

At the two conventions there was an attendance of nearly 5,000, and the displays of railway supply manufacturers, unusually elaborate, broke all records in number. Manufacturers of iron and steel locomotive and car equipment were represented as follows:

American Brake Shoe & Foundry Co., Mahwah, N. J.; American Car & Foundry Co., St. Louis; American Locomotive Co., New York; American Steel Foundries, Chicago; Atha Steel Casting Co., Newark, N. J.; Baldwin Steel Co., New York; Bethlehem Steel Co., South Bethlehem, Pa.; Bettendorf Axle Co., Davenport, Ia.; Buda Foundry & Mfg. Co., Chicago; Buckeye Steel Castings Co., Columbus, O.; Buffalo Brake Beam Co., New York; Cambria Steel Co., Johnstown, Pa.; Cleveland Car Specialty Co., Cleveland; Chicago Railway Equipment Co., Chicago; Commonwealth Steel Co., St. Louis; Crucible Steel Co. of America, Pittsburg; Damascus Brake Beam Co., Cleveland; Davis Solid Truss Brake Beam Co., Wilmington, Del.; Detroit Seamless Tubes Co., Detroit; Falls Hollow Staybolt Co., Cuyahoga Falls, O.; Flannery Bolt Co., Pittsburg; Gould Coupler Co., New York; Kansas City Railway Foundry Co., Kansas City; Keystone Drop Forge Works, Chester, Pa.; Latrobe Steel & Coupler Co., Philadelphia; Love Brake Shoe Co., Chicago; McConway & Torley Co., Pittsburg; National Malleable Castings Co., Cleveland; Penn Steel Casting & Machine Co., Chester, Pa.; Pittsburg Equipment Co., Pittsburg; Ralston Steel Car Co., Pittsburg; Refined Iron & Steel Co., Pittsburg; Schoen Steel Wheel Co., Pittsburg; Scullin-Gallagher Iron & Steel Co., St. Louis; Shelby Steel Tube Co., Pittsburg; Standard Steel Works, Philadelphia; Union Spring & Mfg. Co., Pittsburg; Washburn Steel Castings & Coupler Co., Minneapolis; Western Tube Co., Kewanee, Ill.; National Tube Co., Pittsburg.

One of the features of the exhibit was the large number of high-class machine tools displayed, a number of which were shown in operation. They revealed the wonderful improvements which have been made in recent years since the use of motor drives and high-speed steels. Machine tools and attachments were shown by the following manufacturers:

Armstrong Bros. Tool Co., Chicago; Bickford Drill & Tool Co., Cincinnati; Bridgeport Safety Emery Wheel Co., Bridgeport, Conn.; Bullard Machine Tool Co., Bridgeport, Conn.; Celfor Tool Co., Chicago; Fox Machine Co., Grand Rapids, Mich.; Garvin Machine Co., New York; Gisholt Machine Co., Madison, Wis.; Hanna Engineering Works, Chicago; Landis Machine Co., Waynesboro, Pa.; Lodge & Shipley Machine Tool Co., Cincinnati; Norton Grinding Co., Worcester, Mass.

Other equipment manufacturers included: American File Sharpener Co., New York; Charles H. Besly & Co., Chicago; S. F. Browser & Co., Inc., Fort Wayne, Ind.; Carborundum Co., Niagara Falls, N. Y.; Chicago Pneumatic Tool Co., Chicago; Cleveland Pneumatic Tool Co., Cleveland; Davis Expansion Boring Tool Co., St. Louis; Edwin Harrington, Son & Co., Philadelphia; Helwig Mfg. Co., St. Paul; Independent Pneumatic Tool Co., Chicago; Edwin R. Kent & Co., Chicago; Landis Tool Co., Waynesboro, Pa.; Norton Co., Worcester, Mass.; Pittsburg Automatic Vise & Tool Co., Pittsburg; Joseph T. Ryerson & Son, Chicago; General Electric Co., Schenectady, N. Y.; Stoever Foundry & Mfg. Co., Myerstown, Pa.; Tate, Jones & Co., Pittsburg; Rockwell Engineering Co., New York; Wilmarth, Morman & Co., Grand Rapids, Mich.; Yale & Towne Mfg. Co., New York.

Supply Men Organize.

An organization of the supply men was effected during the convention week to be known as the Railway Supply Manufacturers' Association. Officers were elected as follows: R. T. Walbank, Glidden Varnish Co., Cleveland, president; F. L. De Armond, Protectus Co., New York, vice president, and George N. Riley, National Tube Co., Pittsburg, treasurer.

The executive committee chosen was as follows:

First District (New England states)—Frank A. Morrison, Morrison Regulator Co., Boston.

Second District (New York and New Jersey)—Alex Turner, Galena-Signal Oil Co., New York; A. L. Whipple, Curtain Supply Co., Chicago, and Thomas Aldcorn, Chicago Pneumatic Tool Co., New York.

Third District (Pennsylvania, Maryland, District of Columbia, West Virginia)—George N. Riley, National Tube Co., Pittsburg, and F. L. De Armond, Protectus Co.

Fourth District (Ohio, Indiana, Michigan, Kentucky, Tennessee)—George A. Cooper, Frost Railway Supply Co., Detroit, and A. G. Hollingshead, Ralston Steel Car Co., Columbus, O.

Fifth District (Illinois, Wisconsin, Iowa, Minnesota)—R. T. Walbank, Glidden Varnish Co., Cleveland, and W. H. Miner, W. H. Miner Co., Chicago.

Sixth District (Virginia, North Carolina, South Carolina, Georgia, Alabama, Florida, Mississippi)—L. O. Cameron, Pressed Steel Car Co., Pittsburg.

Seventh District (states west of Mississippi river, including Louisiana, excepting Iowa and Minnesota)—R. H. Weatherly, Scullin-Gallagher Iron & Steel Co., St. Louis.

The master mechanics and car builders elected officers for the ensuing year as follows:

American Railway Master Mechanics' Association—President, William McIntosh, Central Railroad of New Jersey; first vice president, H. H. Vaughan, Canadian Pacific; second vice president, F. H. Clark, Chicago, Burlington & Quincy; executive committee, C. A. Seley, Chicago, Rock Island & Pacific; F. M. Whyte, New York Central; John Howard, New York Central; A. E. Mitchell, New York, New Haven & Hartford.

Master Car Builders' Association—President, G. N. Dow, Lake Shore & Michigan Southern, Cleveland; first vice president, R. F. McKenna, Lackawanna, Scranton; second vice president, R. W. Burnett, Montreal, Can.; third vice president, T. M. Ramsdell, Chesapeake & Ohio. Members of the executive committee: D. F. Crawford, Pennsylvania Lines; T. H. Lines, Louisville & Nashville; and F. H. Clark, Chicago, Burlington & Quincy.

SPECIAL STEELS.

Greatly Increased Use of Iron and Steel Demands New Methods.

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., June 12.

A paper was read before the Birmingham Metallurgical Society June 11 by J. H. Stansbie, on "Special Steels." The speaker said that the rapid increase in the world's output of iron and steel and thein greatly extended use, demanded more rapid methods of dealing with large pieces in the finishing process and an increase in the rate of handling them on the lathe was of great importance. He traced the developments of high speed steels since Mushet in 1868 introduced the self-hardening steel known by his name. But that inventor did not understand all its properties. The next most important step was taken by Taylor and White in America when they proved that steel containing tungsten could be heated near to the melting point, and then quenched in a blast of air, without deterioration.

The lecturer proceeded to examine the constitution of various steels, remarking that American authorities agreed that any equally pure uncemented bar could be used, and much of the American high-speed steel was quite innocent of anything Swedish. The principal reason for the use of Swedish iron in Great Britain was that much of their own marked bar was hardly pure enough for the purpose. But it was said that in spite of a demand for high-speed steel the market for Swedish bars in Sheffield was not particularly brisk. It was probable that high-speed steels could be produced in electric furnaces, and it was difficult to see why that should not be done. Excellent carbon steel was so made, and it would only be a matter of working the bath of steel down to the proper content of carbon and then adding the ferro-alloys. Both the Heroult and Kjellin furnaces should give good results. The speaker proceeded to describe the method of producing high-speed steels, emphasizing the necessity for special precautions. He stated that the peculiar quality of the steel was due to the fact that segregation does not commence until the temperature reaches nearly 600 degrees. The result is that this steel preserves its hardness and stands up to its work when red hot. The speaker showed the effect of manganese and nickel, the latter of which he said increased the tensile strength and elastic limits.

Some attention was devoted to vanadium steels. Apparently, that alloy did not appear to be of much importance in that connection, and its usefulness seemed to be more in the marked influence it exerted upon ordinary open-hearth steel when introduced in small quantities with chromium. Various tests by Captain Sankey, Mr. J. Kent Smith and others pointed to the very great importance of vanadium-chromium steel for constructive material exposed to dynamic stresses. The speaker gave the results of a number of tests by Mr. Smith, which showed that with a large increase in the breaking stress and elastic limit the ductility was also increased This was remarkable, and if it would stand the test of experience, an alloy unrivaled for a variety of purposes was at hand. The largest makers in Great Britain were Messrs. Williams & Robinson, who were said to be exporting their products for use almost entirely in the motor car industry. The alloy was also found to give excellent results when case hardened for with care a glass hard surface on a tough core could be obtained.

The discussion was opened by Mr. Hiorns, who said it was news to him to learn that Mr. Mushet introduced high-speed steel. He would like to know the effect of low temperatures on high-speed steel, as well as high temperatures. His experience was that it was better to heat the steel slowly to a low red, and then bring it rapidly up to the required heat. He thought it would be better to aim at using common materials as far as possible in view of the possibility that the best material would become exhausted.

Mr. Radley said that Mr. Hadfield, of Sheffield, had shown that tungsten could be dispensed with entirely, and that the chief element was chromium. No doubt chromium played a very important part in such steels. In self-hardening steel manganese was an important element. It was remarkable that high-speed steels had not come so much to the front as it was thought a couple of years ago that they would. Probably it was due to the fact that users had kept to the more easily-worked carbon steel.

Mr. Stansbie replying, said that very little work had been done in testing low temperatures on high-speed steel. With regard to the essential elements, his impression was that manganese did the work. An opinion had been expressed by Mr. Kent Smith that chromium was merely the agent for the other metal to work through, but he did not understand what was meant by that. With regard to economy there seemed to be no reason why metal should not be scrapped and worked up again.

MARKED IMPROVEMENTS

In Finished Iron and Steel in England.—Advance in Galvanized Sheets.

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., June 14.

The inevitable result of dear raw materials has been manifest within the past fortnight in a marked improvement of the position of finished iron and steel. The necessity of taking orders below standard prices has for the time being passed away, with the result that all sorts of bars are improving in price. Unmarked bars are booked from £7 5s to £7 12s 6d, and orders are fairly plentiful at these prices. Advances have been declared at 5s in North Staffordshire and Lancashire iron, and the local effect of this is a circular issued by Messrs. N. Hingley & Sons, of Netherton Iron Works, announcing an advance of 5s per ton coupled with the statement that: "Owing to the rapid increases in the value of pig iron and raw material, we can only accept orders subject to agreement." It is quite likely that an advance in marked bars may be declared shortly.

A singular circumstance is the advance of galvanized sheets from £13 15s to £13 17s 6d. It is notorious that business has been rather quiet in the sheet department, especially in the black sheet section, and there has been a good deal of eagerness lately to obtain specifications. Some of the mills are not running more than half time. The quietude is attributed partly to the keen competition on the coast, where the favorable position for export trade places the maker on the seaboard at an advantage of quite 10s per ton over his Midland competitor. Profits have lately approached the vanishing point simply on account of the dearness of raw material. Sheet bars, for example, have advanced out of all proportion to the rise in the finished article. The scarcity of steel has given iron a new stimulus, and wherever iron sheets can be substituted, buyers are preferring the older metal. Unfortunately, the scarcity of puddlers makes puddled bars difficult to obtain. Prices in the Midlands are ascending more rapidly than in the north; but steel makers are better employed, full activity being now resumed at the plate mills, and rail mills are also on full time, while ship builders are better employed, and founders are busy. Generally speaking, the tone is optimistic.

There has been some falling off lately in the armor plate trade of Sheffield but it has been found possible to utilize the machinery for heavy forgings

and general engineering material. A great deal of new work has been placed by the railway companies. The result of the last year's activity has been to encourage the putting down of new mills, the extension of foundries, and the erection of steel warehouses, the general idea being to increase output all around.

A group of Welsh iron reports issued within the last few days show remarkable prosperity. The Tredegar Iron & Coal Co. shows a profit of £128,600 as against £89,700 for last year. The dividend on "A" and "B" shares is raised from 5 per cent to 7½ per cent. Ebbw Vale has a gross surplus of £170,400 against £91,000 for the previous year, and the dividend is increased from 5 per cent to 10 per cent.

CANADIAN SMELTING

Increases Largely In Five Years According to Statistics.

Toronto, June 24.—The Canadian census bureau has issued another bulletin showing the values of manufactured products for 1906, as compared with 1901, classified according to industries. The following are the figures relating to the different branches of the iron and steel trade:

	1901.	1906.
Smelting	$ 7,082,384	$28,426,328
Foundry and machine shop products	15,292,445	24,013,094
Agricultural implements	9,597,389	12,755,748
Cars and car works	3,954,172	14,430,190
Car repairs	7,546,664	11,442,607
Iron and steel products	6,912,457	9,881,385
Plumbing and tinsmithing	6,553,957	11,406,671
Electrical apparatus and supplies	3,032,252	8,996,906
Wire	1,693,995	3,934,484

Boilers and engines show a decrease in output from $4,626,000 in 1901 to $3,473,000 in 1906.

The Manitoba Rolling Mills, located on Logan avenue, Winnipeg, will be opened in the course of a few days for the manufacture of wrought iron. Its raw material will be scrap iron, which has hitherto been shipped from western points to Montreal, Toronto and Hamilton, owing to their being no market for it in western Canada. L. A. McEbroy, of the United States Horseshoe Co., of Erie, Pa., is president of the company, and T. W. Kirkwood, of Toronto, vice president. About $150,000 has so far been invested.

THE DISTRIBUTION OF SULPHUR IN METAL INGOT MOLDS.[1]

By J. Henderson.

The question of the distribution of sulphur in ingot molds made of hematite pig iron was recently brought to the author's notice by the fact that several large molds were alleged to contain an excessive percentage of sulphur, out of all proportion to the sulphur contents of the pig iron from which the molds were made. The fact that much more sulphur is generally found in the tops of ingot molds and other large castings is, or should be, well known to all ingot-mold makers and users. Yet in spite of this it is evident, from recent experience, that some steel makers drill the tops of the molds in order to ascertain the sulphur contents, and on the results so obtained condemn the molds as unfit for use in the open-hearth furnace for melting purposes when they are scrapped. Such a method of sampling is manifestly unfair, Table I shows:

TABLE I.

	No. 1.		No. 2.		No. 3.		No. 4	
	Top Per Cent.	Bottom Per Cent.	Top Per Cent.	Bottom Per Cent.	Top Per Cent.	Bottom Per Cent.	Top Per Cent.	Bottom Per Cent.
Sulphur	0.206	0.034	0.083	0.032	0.075	0.031	0.226	0.058

Nos. 1, 2 and 3 were made from pig iron containing a maximum of 0.030 per cent. of sulphur.

Another method of sampling often adopted is to drill top and bottom and mix the drillings in equal proportions. This could only be correct if the sulphur gradually decreased from top to bottom. To ascertain how far down into the mold the excessive sulphur of the top extended, a piece from the top of a large mold was drilled from the top to a depth of 8 inches, and each inch tested for sulphur, with the exception of the first inch, which was divided and each ½ inch tested separately. The results are shown in Table II:

TABLE II.

	Sulphur Per cent.	Combined Carbon Per cent.	Manganese Per cent.	Silicon Per cent.	Phosphorus Per cent.
1st inch—					
1st half inch	0.198	0.29	1.12	1.26	0.043
2nd half inch	0.142	0.41	1.06	1.21	0.043
2nd inch	0.082	0.44	1.03	1.26	0.044
3rd inch	0.055	0.46	0.99	1.26	0.042
4th inch	0.047	0.46	0.95	1.26	0.042
5th inch	0.045	0.46			
6th inch	0.041	0.46	0.95	1.26	0.042
7th inch	0.041	0.46			
8th inch	0.042	0.46			

In addition to the above, drillings were taken from the outside of the mold from the top to 6 inches down the side, and each inch tested for sulphur. (Each hole was drilled to a depth of ½ inch.) The results are shown in Table III:

TABLE III.

	Sulphur Per cent
1st inch on the side	0.072
2nd " "	0.057
3rd " "	0.047
4th " "	0.044
5th " "	0.043
6th " "	0.044

Table II clearly shows that the excessive sulphur does not go deeper than the first inch, and that after the second inch there is no reason to find fault with the composition of mold As to the other constituents shown in this table, there is only one point which calls for notice, and that is the fact that the lowest percentage of combined carbon is associated with the highest sulphur. This is just the opposite of what is found in pig iron. Under normal conditions of furnace working such a percentage of sulphur as 0.198 would indicate that the quality of the iron was either No. 5 or a mottled iron, with combined carbon 1 per cent. or over. The explanation of the anomaly in this case is no doubt found in the sulphur existing as a segregate of sulphide of manganese, and thus its usual effect of hardening the iron by assisting in the retention of carbon in the combined state is not exerted.

The results in Table III show that the very high sulphur is concentrated in the center of the metal at the top, and diminishes toward the sides.

In the light of these tests it must be evident that in sampling such a mold at the top, without taking into consideration the proportion of the top to the rest of the mold, the results obtained, as regards sulphur, must be very unreliable, and consequently of no value. The mold in question measured 7 feet long and weighed 4¾ tons. A section 2 inches deep cut from the top would weigh 270 lbs. The average composition of that 2 inches is estimated from the data available to be practically 0.095 per cent sulphur. Taking the remainder of the mold to be 0.043 per cent, the average for the whole is 0.044 per cent sulphur, a percentage with which there is no reason to find fault, as regards the use of the molds, when scrapped, for melting purposes in the open-hearth process. Personally, I do not see why the bottom alone should not be drilled, and if the sample so obtained be satisfactory, the mold should be passed. This is a matter of vital importance to ingot-mold makers, who are often asked by their customers to supply molds with a maximum of 0.050 per cent sulphur.

[1] A paper presented at the London (May, 1907) meeting of the Iron and Steel Institute.

DEFECTIVE STEEL RAILS ABLY DISCUSSED

AT MEETING OF AMERICAN SOCIETY FOR TESTING MATERIALS.

Eminent Railroad Men and Manufacturers Participate.—New Specifications Submitted.—Establishing of a New Theory as to Corrosion Declared a Great Scientific Achievement.

No subject considered at the tenth annual meeting of the American Society for Testing Materials, held at Atlantic City, June 20-22, aroused as much interest, or provoked as much discussion as the topic of "Modern American Steel Rails." Both producers and consumers were ably represented by men who have carefully investigated the causes for rail breakages, which, according to current reports, have been more numerous in recent months than at any time in the last decade.

So serious is the problem that meetings of the leading officials of the railroads and rail mills have already been arranged with a view to overcoming the dangers that now beset railroad operation. One of the leading trunk lines has deferred the placing of its 1908 requirements until the rail makers accept its newly promulgated specifications, which are the most rigid ever drawn by an American road. From present indications the order will not be accepted except at a considerable increase over the prevailing quotation of $28 a ton.

Contentions of the Rail Makers and Railroads.

The contention of the rail makers is that the weight of rolling stock is excessive and that there has not been a proportionate increase in the amount of metal going into the rail section. The protests of the railroads is lodged against the speed of manufacture, insufficient manipulation of the material in rolling and claims are also made that some of the steel is of inferior quality.

The entire session held on the steel pier Friday afternoon was devoted to a consideration of the subject and the reading of papers having a direct bearing on the problem. The fact that the report of the committee on standard specifications for steel rails was to be passed upon added further interest to the meeting. Nor was the report finally referred to the members of the society fon a letter ballot without considerable objection, as it was pointed out that if the specifications were adopted, they might be obsolete in a few months, as the interests directly affected have new ones in view. Representatives of some of the leading railroads, inspecting engineers, locomotive builders and rail manufacturers participated in the discussion and new light was cast upon the causes leading up to the failure of rails in service.

THE AMERICAN SOCIETY FOR TESTING MATERIALS AT ATLANTIC CITY.

In introducing the subject, Dr. C. B. Dudley said that standard specification for steel rails was one of the first subjects considered by the organization, and that the society was originally founded to obtain standard specification for iron and steel. Secretary Edgar Marburg then read the opening paragraphs of the committee's report and stated that the discussion of the specifications would be deferrred until after the reading of the papers.

W. R. Webster read a short paper which opened the consideration of this subject, as follows:

Conditions to be Met in Manufacture.

"The different opinions expressed by the representatives of the railway companies and rail manufacturers, in the current discussion, as to what would constitute a satisfactory rail, call to my mind the remarks of Sir Lowthian Bell during the discussion on "Recent Practice in Rails" at the annual convention of the American Society of Civil Engineers, in London, June, 1900, He said:

As he had been 25 years a manufacturer of rails, and 25 years a director in the Northeastern railway, he represented both maker and user, and he had at his disposal 35,000 analyses to go upon in making deductions. From these he could prove, and disprove, everything that could be said for or against any composition of a rail,—a facility beloved by the expert.

"Notwithstanding all this, if the important factors that have a direct bearing on the quality of the finished rail are considered, most of the conflicting opinions can be harmonized. The committees at work on the problems are doing this. They are endeavoring to secure good uniform methods of manufacture by specifying chemical

composition, amount of discard from top of ingot, finishing temperature in rolling, limit of camber in rails coming to the gag-press for cold straightening, and drop tests. They are nearer together now on these requirements than ever before, and it is to be hoped that a specification will soon be arrived at, by interchange of views, which will be acceptable to all.

"It must be admitted that the best rails are produced from steel low in phosphorus, rolled with light reductions and finished at proper low temperature, but the sections now in use make it almost impossible to continue the work of rolling on the head to a low enough temperature to produce the fine grained structure desired. Therefore, a good starting point for this discussion would be section.

"In a recent discussion, it was claimed that the old committee of the American Society of Civil Engineers kept in mind the importance of low finishing temperature, in designing their rails, and gave sections best suited for that purpose. As a matter of fact, the effect of the heat treatment of steel was not properly appreciated at the time the committee made its report in 1892, and the sections do not permit of a low enough finishing temperature in rolling owing to the wide thin flanges. This, to a large extent, has caused the great trouble with 100-pound rails rolled to these sections. Other 100-pound sections gave trouble and on March 25, 1901, I wrote in part, to the American Society of Civil Engineers, asking for a new rail committee:

"I ask that a committee be appointed to investigate and report on standard rail sections. The reasons for asking for this committee are that rails of 80 pounds and over are not giving good service. This is true of all heavy rails whether rolled to American Society of Civil Engineers' section or others. The cause of the trouble is now well known, it being due to the large mass of metal in the head carrying the heat so much longer than the thin metal in the flanges, thus preventing the work of rolling on the head at sufficiently low temperature to break up the coarse grain and produce the tough, good-wearing rails desired."

"The board of directors brought this up for discussion at the annual meeting in June, and the committee was appointed in 1902. It is still struggling with the problem. In the arguments against the appointment of such a committee, it was claimed that sufficient evidence had not been produced to show that the heavier rail sections were not giving as good results as the lighter. Those present today must admit that the results of the past five years have given conclusive evidence that a change in section is advisable. It has been the invariable experience in changing from a light to a heavy section, in any class of rolled steel, that difficulties have been met and modifications have been made in the methods of rolling, in order to get as good a structure in the heavier section as was formerly obtained in the lighter sections. In ordinary sections other than rails, it was a comparatively easy matter to overcome the trouble and get a good structure; but the thin flange of the rail and the higher carbons called for in the heavier sections, further complicate matters.

"If a rail with the same width of head as the present American Society of Civil Engineers 100-pound rail is required, the head will have to be made thicker and the radius under the head larger in order to prevent the sides of the head from shearing or breaking off as at present, and more metal put in the web and flange in order to carry the heat, and thus allow the head to be finished at the proper low temperature. This would mean a rail of 120 pounds to 125 pounds per yard. I believe we are coming to heavier rails before we get rid of our present troubles.

"In all justice, it must be admitted that a fair percentage of breakages is caused by the great increase of wheel loads since 1892, increase in speed of trains, use of large capacity steel cars, also that we do find poor track, poor rail joints, driving wheels not properly counterbalanced, flat wheels, etc. These conditions will no doubt be improved, but they must be considered in deciding on the rail for the future.

"Open-hearth steel rails of the present weight and section rolled under the present conditions of manufacture, cannot be relied on to overcome all troubles.

"Most of the basic open-hearth steel manufactured in this country is much lower in carbon than required for rail steel, and it is therefore much easier to control the uniformity of such steel. The common practice of Bessemer steel rail mills is to allow ten points leeway in carbon and some of the basic open-hearth mills claim to work within these limits, but even as high as 18 points leeway has been asked. It is easier to work within narrow limits of carbon in the acid open-hearth steel process than in the basic.

What is wanted is a steel as nearly uniform in carbon and other chemical elements as possible, without inflicting too great hardship on the manufacturer. We desire full expression of opinion from the basic open-hearth steel manufacturers as to just what chemical requirements and limits they would agree to work to in rail steel.

"It would be a very simple matter to roll 1,000 tons of extra heavy rails of basic open-hearth steel, and 1,000 tons of same section of Bessemer steel, with enough metal in the web and flange to finish them in rolling at the lowest possible temperature without injuring the metal in the flange. In other words, approach as nearly as possible, the rolling conditions of the old bull-head rail, which has been rolled with only 4½ inches shrinkage allowance in a 30-foot rail. Let the chemical composition, per cent of discard, and conditions of manufacture be in accordance with best modern practice. The expense of preparing rolls and rolling such rails would be trifling in comparison with the information obtained, and the rails would be better than any heavy rails ever rolled."

Mr. Talbot's Paper.

Benjamin Talbot in his paper on "Rail Steel as Manufactured by the Continuous Open-Hearth Process," given in full on another page of this issue, dealt with the manufacture of rails at an English works by the well known process of steel making which he invented.

Breakage Due to Gagging.

Morgan T. Jones, inspecting engineer of the American Bureau of Inspection and Tests, Chicago, in a communication to the society, read by Secretary Marburg, asserted that he was convinced that the majority of broken rails could be traced directly to fractures caused by the gagging press. His letter is in part:

I am convinced beyond a doubt that the majority of broken rails can be directly traced to fractures caused by the gag, and in looking over the several reports from various sources during the recent agitation, I fail to find in any one of them where the responsibility has been placed in this direction. I feel perfectly safe in saying that if this matter is properly investigated my assertion will be found to be true, and in support of same I will offer the following comparison:

Take the rail that is submitted for drop tests. This test piece is cut from the front end of the first rail rolled and comes from the top of the ingot, and after being allowed to cool off, naturally we find, in almost every instance, it will resist the enormous shock it receives under the prescribed test. Then again, take a test piece from the same rail after it has received several blows from the gag in straightening and subject this piece to the same test, placing it in position so that the drop will fall directly upon a point at which it has been gagged, and I will venture to say it will not show the same results, and I firmly

believe that this is the all important point to be taken up, with a view to finding a remedy.

It was my intention to make an appeal to the convention on this subject and see if it would not be practicable to straighten a rail by running it into fixed casings covering the flange and web its entire length, allowing enough space around the parts encased to take up the contraction and prevent it from warping out of line and surface, and if the railroad companies decide to remodel their sections, allowing more metal in the base or flange of the rail, I believe the contraction would be so moderate this could be accomplished. The rails could be forced into these casings through a set of dummy rolls placed in position at the point of entry to the casing, and while to inaugurate this system would appear to be costly for the manufacturers, they should not lose sight of the fact that in the long run it would be a great saving to them; besides getting the desired results, it would do away with straighteners, gaggers, straightening machines and cost of maintaining the same, and the space now taken up in the finishing department by these machines could be utilized for cooling beds, and would, therefore, avoid the necessity of making very little change in this respect.

I would like, if you deem it advisable, to have this question brought up during discussion on this subject so as to allow those interested to express their various opinions as to the practicability of my suggestion, and if it be found to be practicable, it would be an easy matter to figure out the form of casing required and other mechanical devices to put it into practice.

I had also intended to say a few words regarding the question of inspection, and the manner in which it is conducted today by railroad representatives, and in forming specifications I would suggest that a clause be inserted compelling the mills to do their loading in reasonable hours, say between the hours of 6 a. m. and 6 p. m. As it now stands, some of the mills commence loading shortly after daylight and continue to sundown, which necessitates doubling the force of inspection if all the rails are to be inspected, and I am of the opinion that an inspection is practically worthless if only a part of the rails are inspected, as that is just when defective rails are liable to get away. This is a question many of the railroads have failed to give proper attention to, as in many instances they appoint representatives without knowing their qualifications to fill the position, and owing to the inexperience of these inspectors they are more or less afraid to offer protest when rails do not conform to specifications, and they pay very little attention to the quality of the rails, as they seldom make any effort to walk over them. It would be well for the railroads to look into this as it would materially help to better the results.

P. H. Dudley detailed "Mechanical Experiences With Limber and Stiff Rails," and in the course of his remarks stated that the Bessemer departments of the mills have not been enlarged proportionately to the other parts of the mill, and that the converters are being driven faster and after recarburizing the blown metal, the time for complete chemical reaction and escape of the slag has been reduced unconsciously before teeming of the ingots has commenced. The reaction therefore being only partially complete, in the setting of the steel in the ingot, the slag, oxides and gases are often entrained instead of eliminated. Photographs were shown of rails taken from the track indicating split heads containing slag in the steel near the bearing surface. The investigation of the author covered a wide field and the paper is one of the most important contributions to this subject made in recent years and will be presented in full in an early issue.

Wear of Rails.

Regarding the wearing qualities of rails touched upon by W. H. Webster and Benjamin Talbot, P. H. Dudley offered the following:

I wish to place upon record, as a matter of fact, that in introducing the use of five and six-inch rails in this country, knowing that the metal in sections of greater mechanical properties would require also increased physical properties to sustain the traffic, I insisted upon this provision in their manufacture. This was opposed generally, except by the time-honored iron master, Mr. John Fritz.

There are over a million tons in service of the five-inch and higher sections in 75, 80, 95 and 100-pound rails which were made in accordance with my specifications, starting in 1884, but particularly in 1891. The tonnage on some of the 100-pound rails has exceeded 350,000,000 tons; others 300,000,000 tons, and the rails are still in service; 150,000,000 to 200,000,000 tons are about the limit reached on the 80-pound rails except in a few places.

A greater tonnage has been carried by the heavy rails than by the light rails they replaced. I, therefore, from experience, with my own sections, do not concur with Mr. Webster, "that the wear has been unsatisfactory upon all 100-pound rails." I made the fillets under the heads of my sections ½-inch radii, which makes a stronger support for the under side of the head than those of less radii.

One of the important features of any section is to secure sound steel in the ingot for the desired physical properties, in the metal and this impart must be by the chemical composition with sufficient time for the reactions of the re-carburizer and escape of the slag formed before the steel is teemed in the ingots.

Subsequent cold rolling in any form of section will not make sound steel having minute slag inclusions, either for wear or for the section as a girder. The latter controls the physical properties of the metal which may be used under the heavy wheel loads, large expenditure of the tractive effort, and high speed trains. The metal must be capable of withstanding in zero or lower temperatures when the steel in the section is under thermal stress due to the falling temperatures before the ends of the rails have rendered in the splice bars.

The cold waves of the past winter in most localities were continuous for several days and the weather cloudy, the sunshine not relieving the severe tension set up in the rails during the night. The friction of a five-inch splice bar is from 4,000 to 4,300 pounds per lineal inch of its length and 80-pound rails might carry a thermal stress of 70,000 to 80,000 pounds, and the 700-pound rails 90,000 to 100,000 pounds before the splice bars would render. These or much less stresses due to the falling temperatures in addition to those of passing locomotives caused many rails to check in metal formerly disturbed in the straightening presses and finally to fracture from repeated strains in zero or lower temperatures.

A railroad in territory where low temperatures yearly occur must have metal in the rails of a quality to withstand such conditions which are not experienced by railroads in warmer climates. The different conditions under which railroads are operated account in part for the difference in opinion in reference to quality of metal for rails. The increase in the number of square inches in the section will subject the rails to larger thermal stresses in low temperatures.

The problems either for the consumer or producer are serious, for they involve the safety of human life for which the consumer as the first party is directly responsible.

The axle loads have doubled in the past 15 years and the requirements for sound and safe rails exceed what some producers consider ample. The heavy sections, when made in ingots of 6,000 and 7,000 pounds rolled in four or five lengths, should be bloomed at first with light draft passes until the skin is toughened to prevent the numerous checks in the bloom which are closed, but not rolled out in the finished section, and often become the incipient point of fracture. The rails in the track, besides carrying the vertical loads, receive lateral shocks which often start the fracture in the base of the rail.

Segregation of Carbon.

Discussing the lessening of the segregation of carbon with a low sulphur content, Prof. Henry M. Howe, Columbia University, offered the following:

We often think of segregation only as concentrating the sulphur and phosphorus harmfully in the upper part of the axis of the ingot; indeed, in case of low carbon steel this is its chief reproach. But in case of high-carbon steel, segregation does the further harm of giving great irregularity of carbon content. If electrical refining processes not only expel sulphur thoroughly, but thereby prevent or lessen the segregation of carbon, this is so much to their good.

In order to answer this question, the author has examined all the available cases of segregation, about

100 in number, and has given his results in a table and diagram which accompany the paper.

Briefly, the evidence answers "No" to our question. In other words, it raises a very strong presumption against the belief that low sulphur content tends to restrain the segregation of carbon.

Mistakes in Rolling.

The discussion was opened by Robert W. Hunt, who concurred in the statements made by W. R. Webster, that a change in the shape of the sections forms the basis from which practical results must be obtained. No matter how carefully the steel is made, proper results cannot be obtained unless the sections are right. He pointed out that when the present specifications were decided upon, much lighter sections than are now generally required were in use by the leading roads, the 80-pound rail being the heaviest section specified, and was only purchased by the New York Central, Delaware & Hudson, and the Maryland Central. For rails over 80 pounds, the sections most easily rolled were devised and were largely the result of experience between the parties interested. This, he added, was the cause of the very bad sections of the heavier rails. The first requisite is a good section, and the next good steel. Sufficient time should, however, be given to the making of the steel, which is oftentimes not done as has been previously pointed out by Dr. Dudley. He then related his experience in the manufacture of steel at Troy, N. Y., many years ago, when a high-grade steel for gunmakers was produced. The ferro-manganese was imported in barrels which had previously contained kerosene, and to improve the quality of the steel the barrel staves were thrown into the ladle of molten metal which resulted in a boiling action from the adhering manganese and greatly improved the quality. He cited this instance to show the care that was exercised in the early days, and the time that was given to the blowing, pouring and rolling of the material. Then the rolls were of smaller diameter, the engines of lesser power and the defects in the blooms and billets were chipped out. The steel made today is manufactured in larger sections and has less work put upon it than when the sections were smaller. Referring to present practice, he said that he had seen ingots given their first passes in blooming mills that have developed large cracks which were further elongated in the rolling, and while they eventually disappeared, he ventured the opinion that if some rail failure could be traced back it would be found to be due to the split in the bloom. To meet the demands of the railroads for better rails, he said that two mills are preparing to roll ingots diagonally before they are received by the blooming mill proper, but that the error is being made of increasing the size of the ingot, whereas without increasing its weight good results would be obtained. In concluding this portion of his remarks, he made a plea for rails with larger webs and flanges rolled at a lower temperature than at the present time.

Changes in Specifications Needed.

Discussing the specifications offered, he said that he was radically opposed to the provisions of the third section for our drop test from every fifth blow of steel. This test might as well be made from an occasional blow as well as from any fifth as specified, as it does not insure the quality of the metal in the other heats. The cost to the manufacturer for equipment for tests from each blow would be slight and be argued that the drop test should be applied to each heat of steel.

The fourth clause, relating to the finishing temperature, he said should be changed and should provide specifically for the number of passes to be given to the rail. He pointed out that it is a positive mistake to assume that anything can be done with the structure of the metal if the time of finishing and number of passes are disregarded. Continuing, he said that if $28 a ton is not a sufficient price for mills they should show their hand, which would place the matter up to the railroads, which, he was certain, wanted the mills to have a handsome profit.

He also demanded a change in the sixth clause, which states that carbon determinations should be furnished the inspector for each blow and a complete chemical analysis of every 24 hours representing the average of the other elements contained in the steel for each day and night turn. This average, he contended, was of no value and he insisted that the analyses be furnished which would give the contents of each rail. He heartily concurred in the provisions of the clause regarding straightening, as he said that the effect of the gagging press is to disturb the skin of the metal which is shown by the shape of the breaks in the rails. Although the distance between the supports of the rails in the gagging press should not be less than 42 inches, he said that the Maintenance of Way Association has adopted a higher standard. He also contended that the characterization of No. 2 rails be made more definite.

Increase of Wheel Loads.

H. V. Wille, Baldwin Locomotive Works, Philadelphia, presented a number of diagrams which showed graphically the increased weights of locomotives as well as the growth in the weights on drivers and axles in recent years. As an example the weight of the 10-E type of engine has increased from approximately 108,000 pounds in 1885 to 200,000 pounds in 1907, the greatest increase dating from 1895, when the engine weighed only 120,000 pounds. The weight on the drivers has increased from 107,000 pounds in 1905 to 179,000 pounds in 1907. In other words, the average increase in the weights on drivers of some of the larger types of locomotives has increased 87 per cent since 1885 and the weights of the locomotives 85 per cent.

C. S. Churchill, chief engineer of the Norfolk & Western railroad, did not agree with Mr. Webster in advocating radical changes in the rail section, but believed that the amount of the metal in the head and the base should be more equally distributed, but he did not favor any enlargement of the head. He contended further that the steel in the rails now received from the mills is not of sufficient strength to carry the loads. Referring to the adoption of heavier sections, he said that the changes are slow and cover a period of years, the Norfolk & Western having adopted the 85-pound rail as a standard in 1894, but as yet they are not in service all over the system. If the rail sections are too light, those of the lower weights should first become defective, but this is not the case, as he said that in 1898, 75-pound sections were laid and are still giving good service. Concerning the defects in rails he said that it has been his experience that incipient flaws do not develop until long after the rail has been in use. On rails laid in Ohio which for 10 years had given good service, flaws were developed shortly after the engine load was increased 10 per cent, the breakage showing in the web near the center. No trouble was caused, as the section men could discover the flaws before the defects became serious. He concluded that this proves that the flaws in the rails do not appear until after a sufficient load is put on them to develop the flaw in the section, the heavier traffic enlarging the defects more rapidly than heretofore. He made a plea for a more homogeneous

metal, poured at a lower heat, and believed that not a railroad in the United States would not gladly meet the increased cost of production. He also urged the rail makers to increase the discard of the ingots to lessen the danger from piping.

Statistics of Rail Failures.

J. A. Kinkead read extracts from the report compiled by the New York Railroad commission covering the number of broken rails removed from the tracks of the principal railroads in that state during the months of January, February and March, 1905, 1906 and 1907, a period of the year when rail breakages are heaviest. It showed that during this quarter in 1905 there were 1,331 removals; in 1906, 826, as compared with 3,014 in 1907. The greatest number of failures was on the Pennsylvania division of the New York Central which reached a total of 469 in 1905, 288 in 1906 and 1,244 in 1907. He believed that a large number of failures are due to the piping of ingots and that sufficient discard should be allowed.

W. A. Bostwick, of the Carnegie Steel Co., Pittsburg, referring to the specifications of English roads as outlined by Mr. Talbot, said that the grades of Bessemer and open-hearth steel used in England are much softer than would be found practicable in this country.

E. F. Kenney, Pennsylvania railroad, opposed the taking of the metal from the head to increase the weight of the base as 90 per cent of the breakages are now in the head. He contended for increased metal in the base if necessary but added that care should be exercised in changing the weight of the head.

Improvement by Rerolling.

That rerolling rails improves their quality was pointed out by A. A. Kendrick, vice president of the Santa Fe. In 1887, 470 miles of 75-pound rails between Chicago and Kansas City were removed, rerolled and relaid on a western division, where they were subjected to the wear of the heaviest locomotives operated by the company, the engines having 234,000 pounds load on the drivers. These rails gave better results than the 85-pound sections with which they were replaced on the Chicago division. He ventured the opinion that at some point in rolling the rail should be reheated as was done previously, as a much better rail would then be secured than by the present process of continuous rolling. The lack of sufficient working of the rails in rolling, which has been so popular, has cost the railroads hundreds of millions of dollars and he added that the point would be reached when the rail makers would take up the matter voluntarily or it would otherwise come up to the legislatures with subsequent danger to the rail manufacturers.

Speed of Rolling Not Increased.

P. E. Carhart, Illinois Steel Co., Chicago, referring to the statements that had been made regarding the increased speed of rolling and manufacture generally, stated that the time consumed in rolling and the speed of the engines are the same as they were 17 years ago. Then it required 1½ hours to change rolls, as compared with 20 minutes at present. The increased output is not due to the increased speed at any point, but to the elimination of delays and the team work on the part of the working force. He added that the same soaking pits are in use, the same blowers and the same mill layout exists as in former years with no reduction in the time required for any of the various steps in the rail-making operations. To secure good rail sections, the rolls should be kept full and should be retained at the proper rolling temperature. He also recently made careful investigation of the causes leading to the moon or crescent shaped breaks in rails and found that they were due to the impact blows from engines that are not well balanced. On one road, immediately after a broken rail is discovered, the locomotives are looked over to discover the seat of the trouble. In one case, the engine was found to have a flat spot 20 inches long on the driver which extended from zero to ⅛ of an inch in depth and undoubtedly resulted in the breaking of the rail. The impact blow at the minimum point was at a pressure of 4,000 pounds and at the maximum 57,000 pounds. When this is spread over a fraction of an inch, it can readily be seen that the rail receives a tremendous impact blow. If it were possible to increase the impact blow as on a bridge, a rail section could be easily designed that would prove satisfactory.

Robert W. Hunt related that while in the office of the president of a large eastern trunk line recently he was shown photographs of rails that had broken in service. The westbound track was laid with 75-pound rails and in every instance the broken rails were taken from the eastbound track laid with the heavier sections. He agreed with what had been said relative to the operation of the mills at their utmost capacity, but facetiously pointed out that it had come to his notice that ingots that should have remained in the soaking pits 1½ hours were removed after 50 minutes for the purpose of keeping the mill running full.

Faults in Splicing.

As another probable cause for the breaking of rails, not previously referred to, Prof. Mansfield Merriman spoke of the bolting of splice bars as in present practice the bar is as far away from the web as possible, sometimes from ⅛ to ¾ of an inch. The strain on the bolts must, of coufse, be very great and he assumed that the action of the plates adjusted in this way must be deleterious to the rails; and believes that this caused the breakages at the ends. His remedy for rail failures lies in a splice bar that will fit snugly against the web and in conclusion he stated that the present rail section was of a pretty good shape and should not be disturbed.

In reply, Mr. Trimble, of the Pennsylvania Lines West, stated that the breakages do not occur at the rail ends but at distances ranging from 4, 8, 10 and 12 feet from the ends. Of a total of 100 rails removed in a broken condition, he did not believe that one gave way as a result of the splice bars.

Longer Life of Light Sections.

Concerning the longer life of the lighter sections, George E. Thackray, Cambria Steel Co., Johnstown, Pa., said it was probably due to their greater flexibility. Regarding the limited removal of rails from tracks laid with the lighter sections, he believed it was due to the fact that they had been in service longer than the heavier sections and that the defective ones had been previously taken out.

C. S. Churchill agreed with what had been said about the slow adoption of the heavier sections and that the wheel loads have not been increased very rapidly, although it is generally supposed that the reverse is true. However, the rails have only increased in weight 10 to 15 pounds, as compared with a triple growth in the weight of the wheel load. He did not believe that the railroads kept up the rails to the standard of present-day requirements in their anxiety to secure tonnage and increased traffic.

Suggestions were then made by a number of the speakers that the skidding of car wheels from the sudden application of brakes had a bad effect on the tracks and that the chilled

gray iron wheel might be a contributory cause. It was stated, however that the chilled wheel as made today is better than ever before and that the castings are remarkable considering the severe tests to which they are subjected before final acceptance by the railroad.

M. H. Wickhorst gave the results of his investigation of 50 breaks, all crescent shaped, in a small section of track. The failures occurred largely on the north rail of a single track and mostly on the inside flange of the base of the rail. Furthermore, most of the failures occurred over tie plates and on the left hand rail. The pieces were taken from a track having a heavy grade to the eastward and indicated fast speed. From these conditions he concluded that there was a heavy impact when the locomotive swerved to the left. From light pieces which were etched be found that all showed a sound condition except one that displayed signs of porosity, but there were no traces of piping. The chemical analyses all came within the prescribed limits. The physical tests showed nothing abnormal in the tensile strength, and there was a good elongation and reduction of area. Tests to ascertain whether more rolling and work in the mill would have proved beneficial showed better physical qualities. The large number of breakages were undoubtedly due to a peculiar combination of circumstances, including severe weather and the tie plates which made a practically rigid track and had a tendency to localize the impact of the equipment. In conclusion, he stated that the failures were not due to any defects in the rails but were caused by condition of operation. He believed that a higher grade of material is required, as the steel accepted in rails would be rejected in locomotive forgings.

J. P. Snow, referring to the crescent-shaped breaks in his road, stated that all showed possible longitudinal seams in the base of the rail. Some of these seams were discolored by rust and could be seen before the break in the rail occurred. Inasmuch as unbalanced drivers pass over miles of road and do not break all the rails, that fact proved to him conclusively that only the bad rails fail. In all cases the fracture started from the fracture in the base and, if this is corrected, he believed that much would be done towards solving the difficulty.

H. B. Seaman spoke of rails that had been in service 20 years and when taken up showed wear of only 1-16 of an inch. While they originally cost $60 a ton, they were cheaper in his opinion than those now offered at $28.

In concluding the discussion, Dr. C. B. Dudley said that the consumers of railroads believe that the cause of frequent breakages is due to poor rails. On the other hand, producers are of the opinion that the conditions of service are too severe. He stated that it was admitted that wheel loads and speeds have been increased. Nevertheless, it is a fact that the breakages are serious and the question arises how to get a better rail. Modifications of the sections have been proposed as well as an increase in the amount of discard. The discussion, he concluded, was merely a contribution to the subject and asked all to draw their own conclusions.

The question of referring the standard specifications as reported by the committee to the society for letter ballot was then offered and an objection was made that such action might be premature in view of the conferences that are now being held by the railroad officials and rail makers to solve the difficulty and which would undoubtedly result in the adoption of a new set of specifications. Members of the committee, however, requested that action be taken. It was then unanimously decided to refer the adoption of the specifications to the members of the society for a letter ballot. The report of the committee follows:

Report of Committee A.

At the last annual meeting the report of Committee A on Standard Specifications for Steel Rails was referred back to the committee with instructions to report at the next annual meeting proposed standard specifications for steel rails which will give promise of correcting as far as possible the defective quality of rails obtained under existing specifications.

In pursuance of that resolution, the executive committee appointed a subcommittee of Committee A to prepare a report on proposed standard specifications for steel rails.

This sub-committee, consisting of W. A. Bostwick, P. E. Carhart, Charles B. Dudley, E. F. Kenney, Edgar Marburg, George E. Thackray and W. R. Webster, held two meetings, and unanimously agreed to reaffirm the recommendations with respect to standard specifications for steel rails made at the last annual meeting, with the following modifications:

1. DISCARD. There shall be sheared from the end of the blooms formed from the top of the ingots not less than x per cent[1] and if, from any cause, the steel does not then appear to be solid, the shearing shall continue until it does.

2. STRAIGHTENING. To adopt the clause governing straightening in the specifications recommended by the American Society of Civil Engineers, adding the following sentence at the end of the first paragraph:

"The distance between supports of rails in the gagging press shall be not less than 42 inches."

This action was submitted to Committee A for letter ballot which resulted in 22 affirmative votes sustaining the action of the sub-committee and two negative votes. The proposed Standard Specifications for Steel Rails are as follows:

Proposed Standard Specifications for Steel Rails.

(1) (a) The entire process of manufacture and testing shall be in accordance with the best current practice, and special care shall be taken to conform to the following instructions:

(b) Ingots shall be kept in a vertical position in the pit heating furnaces until ready to be rolled or until the metal in the interior has time to solidify.

(c) No bled ingots shall be used.

(d) There shall be sheared from the end of the blooms formed from the top of the ingots not less than x per cent[2] and if, from any cause, the steel does not then appear to be solid, the shearing shall continue until it does.

Chemical Composition.

(2.) Rails of the various weights per yard specified below shall conform to the following limits in chemical composition.

	50 to 59 Pounds. Per cent.	60 to 69 Pounds. Per cent.	70 to 79 Pounds. Per cent.	80 to 89 Pounds. Per cent.	90 to 100 Pounds. Per cent.
Carbon	0.35-0.45	0.38-0.48	0.40-0.50	0.43-0.53	0.45-0.55
Phosphorus, shall not exceed	0.10	0.10	0.10	0.10	0.10
Silicon, shall not exceed	0.20	0.20	0.20	0.20	0.20
Manganese	0.70-1.00	0.70-1.00	0.75-1.05	0.80-1.10	0.80-1.10

Drop Test.

(3) One drop test shall be made on a piece of rail not less than four feet and not more than six feet long, selected from every fifth blow of steel. The test shall be taken from the top of the ingot. The rail shall be placed head upwards on the supports, and the various sections shall be subjected to the following impact tests under a free falling weight:

	Weight of Rail, Pounds Per Yard.			Height of Drop Feet.
	45 to and including	55		15
More than..	55	"	65	16
More than..	65	"	75	17
More than..	75	"	85	18
More than..	85	"	100	19

If any rail break when subject to the drop test, two additional tests, taken from the top of the ingot, will be made of other rails from the same

[1]The percentage of minimum discard in any case to be subject to agreement and it should be recognized that the higher this percentage the greater will be the cost.

[2]The percentage of minimum discard in any case to be subject to agreement and it should be recognized that the higher this percentage the greater will be the cost.

blow of steel, and if either of these latter tests fail, all the rails of the blow which they represent will be rejected, but if both of these additional test pieces meet the requirements, all the rails of the blow which they represent will be accepted.

Finishing Temperature.

(4) The number of passes and speed of train shall be so regulated that on leaving the rolls at the final pass the temperature of the rail will not exceed that which requires a shrinkage allowance at the hot-saws, for a 30-foot rail of 100-pound section, of 6 11-16 inches, and 1-16 inch less for each 5-pound decrease of section. These allowances to be decreased at the rate of 0.01 inch for each second of time elapsed between the rail leaving the finishing rolls and being sawn. No artificial means of cooling the rails shall be used between the finishing pass and the hot-saws.

Drop Testing Machine.

(5) The drop testing machine shall have a tup of 2,000 pounds weight, the striking face of which shall have a radius of not more than 5 inches, and the test rail shall be placed head upwards on solid supports 3 feet apart. The anvil block on solid supports shall weigh at least 20,000 pounds, and the supports shall be part of, or firmly secured to, the anvil. The report of the drop test shall state the atmospheric temperature at the time the test was made.

Chemical Analyses.

(6) The manufacturer shall furnish the inspector, daily, with carbon determinations for each blow, and a complete chemical analysis every 24 hours, representing the average of the other elements contained in the steel, for each day and night turn. These analyses shall be made on drillings taken from a small test ingot.

Weight Section.

(7) Unless otherwise specified, the section of rail shall be the American Standard, recommended by the American Society of Civil Engineers, and shall conform, as accurately as possible, to the template furnished by the railroad company, consistent with paragraph No. 8, relative to specified weight. A variation in height of 1-64 inch less, or 1-32 inch greater than the specified height, and 1-16 inch in width will be permitted.

(8) The weight of the rails will be maintained as nearly as possible, after complying with paragraph No. 7, to that specified in contract. A variation of one-half of one per cent for an entire order will be allowed. Rails shall be accepted and paid for according to actual weights.

Length.

(9) The standard length of rails shall be 30 feet. Ten per cent of the entire order will be accepted in shorter lengths, varying by even feet to 24 feet, and all No. 1 rails less than 30 feet shall be painted green on the end. A variation of ¼ inch in length from that specified will be allowed.

Finish.

(10) Circular holes for splice bars shall be drilled in accordance with the specifications of the purchaser. The holes shall accurately conform to the drawing and dimensions furnished in every respect, and must be free from burrs.

(11) Straightening—Care must be taken in hot-straightening the rails, and it must result in their being left in such a condition that they shall not vary throughout their entire length more than 5 inches from a straight line in any direction when delivered to the cold-straightening presses. Those which vary beyond that amount, or have short kinks, shall be classed as second-quality rails and be so stamped.

The distance between supports of rails in the gagging press shall be not less than 42 inches.

Rails shall be straight in line and surface when finished—the straightening being done while cold—smooth on head, sawed square at ends, variation to be not more than 1-32 inch, and, prior to shipment, shall have the burr occasioned by the saw cutting removed, and the ends made clean. No. 1 rails shall be free from injurious defects and flaws of all kinds.

Branding.

(12) The name of the maker, the weight of the rail and the month and year of manufacture shall be rolled in raised letter on the side of the web, and the number of blow shall be plainly stamped on each rail where it will not subsequently be covered by the splice bars.

Inspection.

(13) The inspector representing the purchaser shall have free entry to the works of the manufacturer at all times when the contract is being filled, and shall have all reasonable facilities afforded him by the manufacturer to satisfy him that the finished material is furnished in accordance with the terms of these specifications. All tests and inspections shall be made at the place of manufacture prior to shipment.

No. 2 Rails.

(14) No. 2 rails will be accepted up to 10 per cent of the whole order. Rails that possess any injurious defects, or which for any cause are not suitable for first quality, or No. 1 rails, shall be considered as No. 2 rails; provided, however, that rails which contain any physical defects which impair their strength shall be rejected. The ends of all No. 2 rails shall be painted white in order to distinguish them.

Papers on the "Effect of Conditions of Rolling on Certain Properties of Steel" by H. M. Howe and William Campbell and "The Heat Treatment of Steel" by William Campbell were read by title.

Thursday's Session.

The opening session, held Thursday afternoon at the Hotel Chalfonte, was devoted largely to the consideration of coal specifications. The minutes of the previous meeting were adopted after greetings had been extended the society by its president, Dr. Charles B. Dudley.

C. S. Skinner, of the Westinghouse Electric & Mfg. Co., Pittsburg, read a paper on "The Raw Material Supply," which he prepared in co-operation with P. H. Knight. He called attention to the large number of articles used by the modern manufacturing plant which can be classed as raw materials, and no less than 800 enter into the products manufactured by the concern with which he is connected. He pointed out that manufacturers necessarily derive great benefits from testing and investigating samples of material received from time to time which often give valuable information and start investigations that lead up to the adoption of a material possessing superior qualities or economical advantages. He suggested that a card index be kept of samples and new materials having valuable characteristics, standard materials regularly used in production, and sample-illustrations of undesirable characteristics that have caused failures in regular service. Such an exhibit gives engineers and draftsmen, at any time, a convenient opportunity to see the materials they are required to specify and to learn their characteristics.

In the absence of C. H. Zehnder, Dr. Richard Moldenke presented the report of committee J on Standard Specifications for Coke. He said that he could only report progress owing to the removal of the testing plant from St. Louis, but careful investigation will soon be made and some are now under way, the results of which will be presented later.

Gain in Membership.

The report of the executive committee showed a growth in membership since the ninth annual meeting, from 835 to 925. This increase, however, has not fully met expectations, and the committee again urged the members to bring the advantages of the society to the notice of persons interested in the broad field it aims to cover and qualified to assist in the furtherance of the same. The losses from resignation and members dropped on account of arrears in dues were also substantially larger than in former years, and although 156 new members were enrolled, the net gain was only 90. The large cost of the last volume of the proceedings and rapidly increasing business of the society resulted in a small deficit for the year ending June 15, 1907, the cash balance being $258.80, with outstanding obligations aggregating $274.80, notwithstanding that the affairs of the society have been carefully administered. Owing to the fact that the estimated proceeds for the remainder of the year will hardly cover current expenses, it has been decided

to call on the contributing members for dues of the current year, with the expectation that the necessity of doing so is not likely to recur in the future. The total receipts reported by the treasurer for the year ending June 15, amounted to $6,180.21 and the disbursements, $6,416.59. Of the 925 members of the American Society, 269 hold membership in the International Association.

Purchasing Coal.

Three papers were offered on the subject of "The Purchase of Coal Under Specifications and Method of Testing." J. E. Woodwell outlined some of the features of a number of specifications in general use and offered those which have been recently adopted by a number of departments of the government. The specifications require analyses showing ash, volatile matter, sulphur and the amount of dust and fine coal it contains as delivered at point of consumption. Provisions are also included in the proposals for sampling and causes for rejection are also given. Payment is made on the basis of the price named in the proposal, corrected for variations in treating value and ash, as shown by analysis, above and below the standard established by the contractor in the proposal. For example, if the coal contains two per cent, more or less, B. T. U. than the established standard, the price will be increased or decreased ten per cent accordingly. The price is also further corrected for the percentages of ash. For all coal, which by analysis contains less ash than that established in the proposal, a premium of one cent per ton for each whole per cent less ash will be paid. An increase in the ash of two per cent over the standard will be tolerated without exacting a penalty for excess ash. For an excess of ash above two per cent over the standard deductions are provided in accordance with this excess.

Dwight T. Randall, engineer in charge of smoke investigation, U. S. Geological Survey Fuel Tests, also presented a paper on this subject and was followed by S. S. Voorhees, who briefly outlined a number of methods of testing coal used by the government departments. It was stated that these various branches annually expend $6,300,000 for coal, and that the saving that will be effected by these tests will be enormous. Several of the members however related their experiences in endeavoring to purchase coal by specification and the refusal of the dealers to entertain such proposals. This was especially true of the anthracite shippers, and in localities such as the New England district, where competition is not very keen.

Testing Plant Moved.

H. M. Wilson, representing Dr. J. A. Holmes, said that the fuel testing plant established at St. Louis at the time of the exposition had been dismantled and removed to Norfolk, Va. The coke testing plant has been removed to Denver where investigations are being conducted to ascertain the coking qualities of coal from a large acreage owned by the U. S. government. Norfolk has been chosen as it is one of the largest coal shipping points in the country. In addition to the anthracite and bituminous coal tests, investigation will be conducted to ascertain the fuel values of Texas lignites and peats from Maine and Florida. English and German briquetting machines will be installed in addition to the American machine which has been shipped from St. Louis. Comparative tests will also be made to ascertain the relative fuel values of denatured alcohol and gasoline, and alcohol appliances, such as lamps, heaters, etc., will be shown at the Jamestown exposition.

At a subsequent meeting, on motion by Mr. Voorhees, the appointment of a committee on standard specifications for coal was referred to the executive commmittee.

Cast Iron Discussed.

"Cast Iron—Some Causes of Failure in Service," was the topic of a paper read by Robert Job. He pointed out how it is possible to improve the quality of castings by a careful consideration of the iron melted in the cupola and subsequent steps in the production of gray iron sections. He also related an experience in the manufacture of locomotive castings which failed in service and explained how the difficulties had been overcome.

The following papers and reports were read by title: "Notes on Brick Pier Tests," J. E. Howard; report of committee 2, on Standard Specifications for the Grading of Structural Timber; "The Effect of Moisture on the Strength and Stiffness of Wood," H. D. Tieman.

W. A. Bostwick and W. R. Webster were elected members of the executive committee to serve two years, the term of the remaining officers holding over.

Dr. Charles B. Dudley chose for the subject of his annual address, "The Enforcement of Specifications." The presentation of the difficulties encountered in the enforcement of specifications by one who has undoubtedly had a wider experience in this work than any other chemist or testing engineer in this country, aroused the interest of the members of the society, who crowded the meeting room Thursday evening in anticipation of the presidential discourse. The address was enthusiastically received and at its close the speaker was loudly applauded.

The Enforcement of Specifications.

Dr. Dudley reviewed the growth of the idea of specifications, stating that they were at first little more than attempts on the part of the consumer to tell the producer what he wanted; later on, as knowledge of materials increased and as methods of testing became better understood and more completely worked out, specifications took on a new meaning. It was at first a demand, while now it is an agreement. The speaker reviewed the principal reasons for differences between producer and consumer regarding specifications, showing that each might arrive at a different conclusion regarding them and yet both be perfectly honest. The reasons for the failure of manufacturers to live up to specifications were gone into at some length. Among other considerations tending to this result is the fact that a manufacturer is oftentimes willing to take a contract involving a difficult or impossible condition and trusting that later on the non-agreement of the product with the specification will be overlooked or condoned. Dr. Dudley stated that as an abstract consideration a producer has no right to take a contract under a specification that he knows he cannot fill. An improperly worded or unreasonable specification is a most potent cause for the tendering of unsatisfactory material. In concluding his address, Dr. Dudley spoke as follows:

We will conclude by presenting very very briefly a problem which has had lodgment in our own brain for quite some time now, and which recent events in regard to certain materials have seemed to force into prominence. It is plain that in using materials in those constructions which involve safety in the railroad sense, or risk of human life in the public sense, there is a question of responsibility involved. If rails are defective and break, if an accident with loss of life results from the use of poor material in car construction, if a bridge falls and produces a disaster due to inferior materials, or a building collapses from the same cause, it is clear that some one should be held responsible; and since there are but two parties involved in the materials, viz., those who make them, and those who accept and use them, it is difficult to see how one or the other of them is going to escape the responsibility. Now, our problem is, which of the two, in equity, should be held responsible? It is perhaps hardly wise at this time to attempt a definite answer. Much

might be said on both sides, and probably no two persons, certainly neither of the two parties most interested, would give the same answer. But there is a phase of the case which we would like to present. It is well known that in the earlier structural work, when safety was involved, there was no testing worthy the name, and materials were bought and used on the reputation of the maker. Fortunately the constructions in most cases had a high factor of safety. When disaster did come, if it was due to defective materials, it was explained that the materials used were from those of the highest reputation in the business, and that no one could really be held responsible. But at the present time conditions have changed. The knowledge of the properties of materials of construction has increased, methods of testing and testing appliances have grown up in delightful profusion, and it is today entirely possible, we feel safe in saying, for an engineer to be reasonably sure that defective material does not go into his structures. We waive here the discussion of commercial considerations, as affecting the use of materials. If it is shown that these have led to the use of defective materials, the moral responsibility for loss of life must certainly go to the one who has allowed commercial considerations to have such undue weight, be he either the maker of the material, or the one high in authority, who has allowed it to be used. But the point we want to make is, in view of present knowledge, and present means and appliances for testing, are engineers or their principals any longer entitled to offer as an excuse for defective materials that they were bought from the best makers? Can they equitably do so? Can they legally do so? Is not the time near at hand when engineers and their principals will be compelled if not legally, then by force of public opinion, to acquire by the establishment of laboratories and means of testing, by the making and enforcement of specifications, such knowledge in regard to the materials they are putting into structures, as will give the public greater security than it has, against disaster.

New Corrosion Theory.

One of the most important matters presented at the tenth meeting of this society relates to the discovery of a new theory, borne out by experiments, of the underlying principles under which the corrosion of iron and steel takes place. The three theories which have been held to account for the corrosion and rusting are the carbonic acid, the hydrogen peroxide, and the electrochemical or electrolytic theories. The first two theories, which have been from time to time vigorously defended by investigation, have not been found adequate, nor have they been borne out by critical investigations.

From a series of experiments conducted by Alberton S. Cushman, assistant director, office of Public Roads, U. S. Department of Agriculture, it would seem that the electrolytic theory has been established as the correct one beyond the peradventure of a doubt. Stereoptican views were used by the speaker to illustrate some of his experiments. His address evoked great enthusiasm, frequently interrupted by applause. Dr. Charles B. Dudley stated that the establishment of this theory is one of the greatest scientific achievements in the last 25 years, providing as it does, means for ultimately preventing the corrosion of iron and steel products.

An abstract of the speaker's remarks follows:

Mr. Cushman's Paper.

Solutions of chromic acid and its salts, such as the chromates and bichromates of potash and soda, have been found to exercise an inhibitive action on the rusting of iron and steel. This inhibitive action is all the more striking from the fact that the chromates are strong oxidizing agents. A solution of potassium bichromate no stronger than one six hundredth normal will indefinitely prevent the rusting of polished specimens of metal in cold water, even if free access of air and carbonic acid is provided for. Under the same conditions at a boiling temperature no rusting or pitting takes place, if the concentration of the bichromate is above two-hundredths normal.

If iron in any of its forms is immersed in strong solutions of bichromate for a few hours the surface becomes passive, even after it is removed from the solution, washed and wiped. The tendency to rust is inhibited as well as the electrolytic exchange with copper, if the metal is dipped for a short time in 1 per cent sulphate solution. This passive condition lasts for some time under ordinary conditions, and steel wire nails that have been chromated may be kept under water for much longer periods without rusting than untreated nails.

The passive condition gradually disappears and can be removed by heating, scouring, or by placing the metal in a vacuum. The explanation appears to be entirely electro-chemical. No film of oxide is formed, but the metal appears to have acquired an oxygen film and is thus polarized in the sense of becoming an oxygen electrode.

Iron does not rust in perfectly pure hydrogen peroxide, in which solution oxygen can be made to boil off the surface of polished specimens of iron without producing any speck of rust, even after prolonged periods. Iron rusts in distilled water if oxygen is present, because the iron is attacked by the hydrogen ions supplied by the normal dissociation of water. Iron passes into solution as ferrous hydroxide, which is immediately oxidized to the insoluble red hydroxide and appears as rust.

Acids, acid salts, and substances which hydrolyze in solution with an acid reaction, stimulate rusting by increasing the concentration of the hydrogen ions. On the other hand, alkalies inhibit rusting in sufficient concentration, by preventing the existence of hydrogen ions.

The rusting of iron is therefore not due to the direct attack of oxygen combined with water. The role of the oxygen is a secondary one and the underlying cause of rusting and corrosion is an electro-chemical or electrolytic problem. Interpreted from this point of view, the rusting of iron invariably proceeds as follows: Iron passes into solution as a ferrous ion by replacing hydrogen which is set free; oxygen then oxidizes the ferrous ion to the ferric condition with the formation of a hydrated oxide. All soluble inhibitors, such as alkaline solution or chrome acid and its salts, act either by preventing the presence of hydrogen ions or by electro-chemically preventing their attack.

The rusting of iron being essentially an electro-chemical process, is invariably accompanied by electrolytic effects. Differences of potential are established on the surface of the metal, owing to imperfect distribution of metallic impurities, and for other reasons. Positive and negative points, nodes and areas are thus formed, leading to local action and pitting. This electrolytic action can be demonstrated as a universal accompaniment of the rusting of iron. Agar-agar and gelatin jellies impregnated with phenol phthalein and potassium ferri-cyanide invariably show red and blue nodes on speciments of iron and steel imbedded in them. This combined indicator has been called "ferroxyl." The blue nodes are the positive poles where iron is going into solution; the negative zones are shown in red. No rusting takes place in the red areas, except when a change or reversal of the poles takes place. Pitting is simply a case of persistent positive poles whereas superficial rusting of a surface is due to frequent changes of potential with reversals of the positive and negative polar areas. The formation of craters and cones of ferric oxide on the surface of rusting metal is demonstrated and explained.

Concrete Columns.

A. N. Talbot presented results of tests on concrete columns reinforced with steel loops and wire, and J. E. Howard also read a paper entitled "Some Additional Notes on Tests of Concrete Columns." R. A. Cummings briefly presented the results of tests with hollow concrete telegraph poles as compared with wooden poles, conducted for the Pennsylvania railroad, which indicated that concrete is the best material for carrying the loads to which these members are subjected. A paper on "The Influence of Stress upon the Corrosion of Iron," by W. H. Walker and Colby Dill, was read by title.

Preservative Coatings.

Preservative coatings and lubricants were discussed at Friday morning's session. The report of committee E was presented by its chairman, S. S. Voorhees. The series of tests planned last year have been started, 19 differ-

ent paints having been applied to 600 feet of the double track deck bridge erected by the Pennsylvania railroad over the Susquehanna River at Havre de Grace. The record of time of cleaning, painting, with weather condition, condition of paint, area of surface covered, and manner of application were presented with this report. The analyses of the paint are being made and will supplement the committee's report, together with the results of periodic and systematic inspections.

"Priming Coats for Metal Surfaces; Linseed Oil vs. Paint," were discussed by F. P. Cheesman, and "Deleterious Ingredients in Paints," by L. S. Hughes, G. W. Thompson and F. P. Cheesman. R. S. Perry read a paper entitled "The Physical Properties of Paint Fillers," and E. F. Ladd "North Dakota Legislation Enacted to Protect Consumers Against Adulteration." Other topics discussed included the "Physical Testing of Varnishes," by J. C. Smith, and the report of committee H. "On Standard Tests for Lubricants" was read by title.

Staybolt Specifications.

The consideration of the report of committee M on "Standard Specifications for Staybolt Iron" was the first order of business of the Saturday morning session. After a discussion of its provisions it was decided to refer it back to the committee for further consideration. E. L. Hancock followed with results of tests of staybolt iron made with hollow bolts, which showed that the fibers in hollow bolts are more closely united than in solid bolts. Dr. Charles B. Dudley, in commenting on these tests, said that the problem of staybolts is in a better condition than at any time in the last 15 years. The study given the subject and the success of vibratory tests have resulted in great improvement and less breakage than formerly. He believed that on account of the shearing action of the plates a slight reduction in the circumference of the bolts might result in less breakage. In reply it was stated that by reducing their circumference the number would necessarily have to be increased, which would undoubtedly interfere with the removal of the boiler scale.

Springs.

The report of committee T, on the tempering and testing of steel springs and standard specifications for spring steel was next presented by J. A. Kinkead. He asked that the committee be continued for another year, and that the manufacturers and consumers report the results of their experiences with the specifications as outlined.

Henry Souther, in discussing the subject, said that the automobile business has driven the manufacturers to extremes never reached before, and that by polishing and lubricating the leaves of springs for automobile use a great improvement in the springs has been noted. The tempering of the steel used in springs, he pointed out, is a most important factor in their successful manufacture.

Uniform Speed in Testing.

Paul Kreuzpointner, Altoona, Pa., presented the report of committee O, on uniform speed in commercial testing. The committee's investigation related to the effects of speed when testing iron and a total of 1,014 tests were made with material of varying sizes. As a result of these experiments recommendations were made regarding commercial tests of staybolt and common wrought iron. Any speed up to and including six inches per minute it was stated gives sufficiently safe and reliable results for commercial purposes.

F. P. McKibben presented a report on "Tension Tests of Steel Angles," and "Compression and Transverse Tests of Steel Connecting Rods for Locomotives" were offered by Gaetano Lanza. A paper entitled "The History and Development of the Alloy Practice in the United States as Applied to Railway Bearings," by G. H. Clamer, was read by title.

Prof. Mansfield Merriman was in the chair during the concluding session, Saturday afternoon, Dr. C. B. Dudley having left for Philadelphia. Gaetano Lanza, chairman of the committee on "Standard Methods of Testing," reported that inquiries had been sent during the year to laboratories all over the world inquiring into their methods and that thus far 40 replies had been received. Further communications are expected, and when received the replies will be tabulated and will be presented to the society for consideration.

National Bureau of Standards.

The work of the National Bureau of Standards, conducted by the government, was described by S. W. Stratton. A motion that this bureau be made a court of last resort for laboratories with which members of the society are connected was referred to the executive committee.

"The White-Souther Endurance Test Specimen" was the subject of a paper presented by Henry Souther in which he stated that an endurance test is the best measure of the value of any given material for any given purpose. At the conclusion of his paper Mr. Souther said that while listening to the discussion on the causes for rail breakages the thought was forced upon him that the frequent failures are due more and more to fatigue. Some have beginnings with flaws, but referring more particularly to the crescent shaped failures and the fractures over tie plates, he ventured the opinion that the failures were due to fatigue. He was also convinced that the rails should have more of a fillet under the head as the lack of the support of the head and the sharp angle underneath might be the cause of more failures than generally supposed.

J. E. Howard read a paper on "The Endurance of Steels Under Repeated Alternate Stresses," and a paper by E. L. Hancock on "The Effect of Combined Stresses on the Elastic Properties of Steel," was read by title. L. W. Page described a new impact machine for testing road materials, and C. N. Forrest presented a paper entitled "The Development of the Penetrometer as Used in the Determination of the Consistency of Semi-Solid Bitumens." A machine for measuring deformation in tests of materials was exhibited by H. F. Moore, and multiplying dividers for locating yield points were exhibited by J. A. Capp. Before adjournment Secretary Edgar Marburg reported an attendance of 268, which is a considerable increase over that of last year. In view of the large number of subjects that are offered the society for consideration at its annual gatherings, it is probable the future conventions will cover a period of at least four and probably five days.

Much credit is due Secretary Marburg for the large number of papers available this year, and applicants for membership and those desiring bound volumes of the proceedings can receive them by addressing his office in care of the University of Pennsylvania, Philadelphia.

Dinner to Dr. Dudley.

A complimentary dinner tendered Dr. Charles B. Dudley at the Marlborough-Blenheim by the members of the society on Friday evening was a pleasant feature of the meeting. He was likewise the recipient of a handsome silver loving cup, a token of appreciation of his efforts on behalf of the organization, presentation having been made by Edgar Marburg. R. W. Leslie presided and toasts were responded to as follows: "Our Cradle Days," Prof. Mansfield Merriman, first president of the society; "Ladle Days," Capt. R. W. Hunt; "The Technical Press," Willard

Smith; "Our Friends the Manufacturers, They Ain't No Angels and Don't Want to Be," George E. Thackray; "Our Technological Brethren," Dr. W. F. M. Goss.

Meetings of the cement section were held Friday and Saturday mornings. Interesting papers were read on fireproofing and waterproofing materials, and "Tests of Twisted Steel Square Rods for Concrete Reinforcement," were presented by J. J. Shuman, inspecting engineer for the Jones & Laughlin Steel Co., Pittsburg. Valuable specifications to guide engineers were included, as well as other information relating to physical properties of this material.

NEW ENGLAND INDUSTRIAL NOTES.

(Special Correspondence.)

Worcester, Mass., June 24.—The International Oil Engine Co., Danielson, Conn., maker of stationary marine and portable oil engines, has just moved into its new factory, which has about 30,000 square feet of floor space, affording greatly improved facilities for the manufacture of their engines. It is also planned to erect an iron and brass foundry.

The Kinsler-Bennett Co., Hartford, Conn., has filed a certificate of incorporation, capital stock $40,000. It will manufacture special machinery, firearms, automobiles, and automobile parts. The incorporators are: Joseph A. Bennett, E. D. Seymour, G. B. Kinsler and C. S. Lyons.

The National Wire Corporation, Fair Haven, Conn., which has been in the hands of a receiver since January, has been placed in involuntary bankruptcy, this action being taken by Pennsylvania creditors, without notice. Claims against the company amount to about $600,000. Action in bankruptcy proceedings cannot come up in the United States court until thirty days have elapsed, but as the creditors are agreed as to winding up the affairs of the company as speedily as possible, no further delay will be encountered. In the meantime the plant is shut down and its 700 workmen are idle.

The Hoag Rapid Press Co., a California concern, is to erect a three-story factory in Hartford, the structure to be of reinforced concrete.

The Motsinger Rotary Engine Co., Hartford, Conn., was recently incorporated. It is backed by Pennsylvania capitalists, and at the first meeting, elected these directors: E. A. Kunkle, Wm. H. Zuber, Newell H. Motsinger, Hattie C. Motsinger, and M. W. Crownover, all of Greensburg, Pa.

RAIL STEEL AS MANUFACTURED BY THE CONTINUOUS OPEN-HEARTH PROCESS.[1]

BENJ. TALBOT.

As we have been rolling for some little time past heavy flat bottomed rails from steel made from phosphoric Cleveland pig iron by the continuous open-hearth process with which my name is connected, at one of our English works, I have been asked by Mr. Webster to submit a short paper dealing with the results obtained from such steel. We have not, of course, been able to submit any results relating to the life of the rails in actual service, owing to the short time that we have been manufacturing them, but I have obtained from the officials of the works details of some specially severe tests to which some of these rails were subjected, together with the ordinary mechanical and chemical tests of these charges, which will enable one to judge of the very tough nature of the steel obtained.

The continuous process, as probably all present know, is really only a modification of the open-hearth system of steel making, and the product obtained is absolutely open-hearth steel, so that we are not dealing with any untried product. From a metallurgical point of view the use of this process offers several advantages over the ordinary open-hearth process, which it is not here necessary to enter into. It will suffice to say that the essential advantages which the process offers are the production of very large outputs from a given unit of plant, coupled with a very high yield of steel ingots from a given weight of pig iron, as compared with ordinary open-hearth practice.

Steel rails have been made by the continuous process both from molten pig iron and also from Bessemerized metal fed into the steel furnace. In the latter case it is purely a question of the cost of Bessemerizing and small basic additions, as against the cost of a large quantity of oxidizing material otherwise required to convert the crude molten metal. Manifestly a 200-ton continuous steel furnace when fed with blown metal from the Bessemer converter will produce a very large output of ingots, probably some 3,000 tons per week or more. In either case the steel rail made is equally good, as a high carbon, low phosphorus product is obtained, and under such conditions four or five of these furnaces would keep an American steel rail mill busy.

[1]A paper presented at the Atlantic City (June, 1907) meeting of the American Society for Testing Materials.

The rails, of which details are given below, were made from high phosphorus pig iron (about two per cent), far more difficult to treat than the majority of American pig irons. If we had to treat a pig iron similar to that used in the acid Bessemer process in America, containing about 0.01 per cent phosphorus, we should, without taking any pains to do so, lower this phosphorus to about 0.03 per cent, or thereabouts, which is obviously an excellent material for rail purposes as the carbon can be varied at pleasure; that is, it is practically as easy to make 0.7 to 0.8 per cent carbon steel as it is to make 0.3 to 0.4 per cent carbon steel. It is found also from practical experience that the steel from the continuous bath is somewhat less oxidized than steel from the ordinary open-hearth furnace; this is proved from the fact that a given weight of ferro-manganese will increase the manganese in the steel rather more in the case of the Talbot steel than it will in ordinary open-hearth steel, for which reason in practice we add rather less ferro than is required in other open-hearth furnace practice.

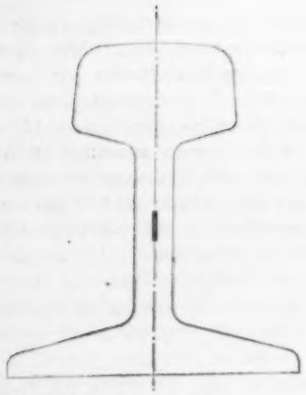
The treacherous nature of steel high in carbon, manganese and phosphorus is too well known to need dwelling upon, and any increase in the carbon accentuates this danger. A point, however, which has not been so much dwelt upon is whether high carbon steel, even though low in phosphorus is not in some cases dangerous, due to the fact that segregation will take place, sometimes to a very marked amount.

The statement has recently appeared in print that the Pennsylvania Railroad has specified that the open-hearth rails which they propose to call for in future must have 0.8 to 0.9 per cent carbon, for 90 to 100-pounds rails, with 0.03 per cent phosphorus. Undoubtedly, this steel should form a very excellent material for rail purposes, if it could be guaranteed that no segregation of the carbon would take place, whereby one part of the rail might become still higher in carbon, and so cause the material to become more brittle. It will be of interest to learn how such higher carbon rails behave in practice, and especially how they stand shock under low temperatures. Possibly rails with 0.75 per cent carbon, 0.03 per cent phosphorus and manganese, not above 0.7 per cent will give the best results.

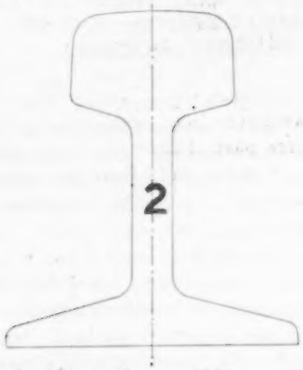
Quality of Material.

We could not fill the requirements demanded by today's specifications with Bessemer steel made from such raw material as is available generally in the United States.

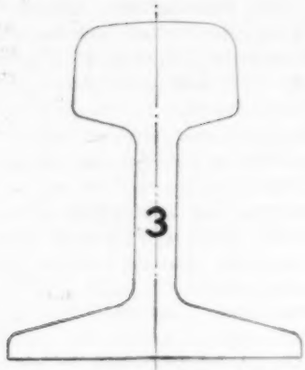
We append a schedule of tests giv-



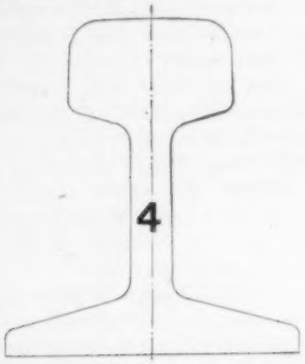
Standard Section now in use.
Area of whole section..... 9.76 square inches
Area of top section..... 4.46 " "
Area of bottom section.... 3.32 " "
99.54 pounds per yard.



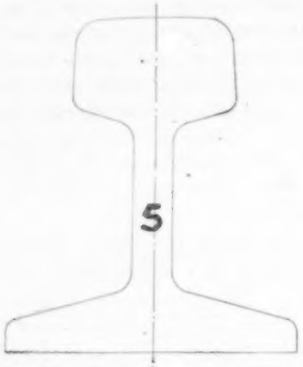
Area of whole section.....10.18 square inches
Area of top section..... 4.75 " "
Area of bottom section.... 3.32 " "
103.7 pounds per yard.



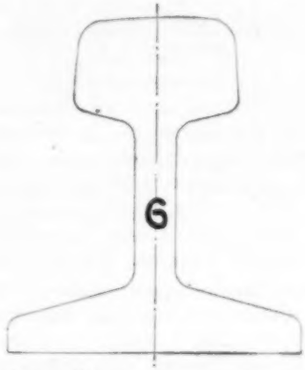
Area of whole section,....10.41 square inches
Area of top section..... 4.75 " "
Area of bottom section.... 3.65 " "
106.05 pounds per yard.



Area of whole section.....10.7 square inches
Area of top section..... 4.75 " "
Area of bottom section.... 3.99 " "
109.01 pounds per yard.



Area of whole section.....11 square inches
Area of top section..... 4.75 " "
Area of bottom section.... 4.32 " "
112.068 pounds per yard.



Suggested section.
Area of whole section.....11.3 square inches
Area of top section..... 4.75 " "
Area of bottom section.... 4.6 " "
115.5 pounds per yard.

PROPOSED AND PRESENT RAIL SECTIONS. SCALE—4 INCHES = 1 FOOT.

ing the mechanical results also the analyses of the steel and molten pig from which such test was made. This steel is basic open-hearth made by the Talbot continuous process. From these figures it will be seen that these rails were subjected to a much more severe mechanical test than is ordinarily called for by engineers. One ton dropped once on to the head after the rail is placed on supports 3 feet 6 inches centers is what is asked for.

With regard to the drop tests in the following schedule. The first drop is with the head up; the rail is then reversed, and in each case came practically straight, upon reversal.

Increased Wheel Loads.

These can only be met by the introduction of a stronger and heavier rail. The tendency in designing T-rails in the past has all been in the direction of big heads, thin webs and flanges together with increased height. In the manufacture of such a rail it is almost impossible to avoid internal strains, set up in cooling on the hot bed.

The duty of the rail designer is to design a rail which will cool straight when laid on the hot bed without cambering. This is only practically possible with a double headed rail (a rail with both heads of equal areas).

In designing a flat bottom rail this condition should be approached as near as possible. Figs. 1 to 6 show a set of sections, No. 1 being a fairly representative 100-pound rail. No. 6 is a suggested section with head and flange of equal area. This would be as near as it would be possible to approach the perfect design with T-rails, though a reduction in height might improve it.

Nos. 2 to 5 are intermediate steps or compromises between what we are actually rolling and what we would suggest in the best section. How far would the railway engineer be prepared to go in this direction?

If the matter is carefully gone into, it will be demonstrated beyond any doubt that section No. 6 is a much stronger rail than is accounted for simply by the increase of weight, because with rail No. 1 great strains are already existing before any load is put on. Another beneficial direction to go in is the increase in the radii of the fillets which join web to flange and head respectively

Method of Rolling.

In the formation of the grooves in the rolls much damage can be and often is done to the steel. With the object of increasing the product of a given mill the ingot is rolled off at one heat, with heavy reductions in each pass so as to reduce the number of passes and consequently the time taken in rolling. Our practice is to take large ingots and have a furnace between the cogging and finishing mills which has the effect of acting as an equalizer so that the blooms are delivered to the finishing mill at an even temperature right through, making the bar more easily shaped and the flange of the rail is sent out of the finishing groove at a temperature nearer to that of the head than has hitherto been possible.

This does no doubt lessen the strains set up in cooling on the hot beds. Our practice is to increase the number of passes, decrease the amount of reduction per pass, and get the product by increased speed of the rolls and not by digging into and tearing the metal as is done in the case where too few passes and heavy drafts are adopted.

With regard to rolling temperature,

we may say we roll a 100-pound rail in lengths which give, after crops are cut off, three lengths of 32.8 feet. The first length is cut within 15 to 20 seconds after leaving the finishing groove of the mill and on this we allow 7⅜ inches shrinkage. The next length is cut within 35 to 50 seconds from leaving groove, and here 7¼ inches are allowed. The third is within 60 to 80 seconds and seven inches are allowed for shrinkage. Of course these allowances only apply to 100-pound rails, less allowance being made in lighter rails.

An interesting experiment may be tried on a T-rail, which has been finished and straightened. Take six or eight feet of rail and place it on a planing machine and cut the head off the web at a given point, and both the head and bottom portion will spring out of a straight line sometimes to a very marked extent, thus showing that great internal strains are there. This is a condition that cannot be avoided by the manufacturer without some help from the rail designer.

As rails increase in weight, the ingot from which they are rolled must also increase in size if sufficient work is put upon the rail. If high phosphorus has been permitted for smaller ingots rolled into lighter rails, the same average phosphorus should not be permitted in the larger ingot as greater segregation will occur.

SCHEDULE OF TESTS

	CARBON NO. REQUIRED	ANALYSIS OF STEEL					TENSILE TESTS			DEFLECTION, INCHES, ON DROP OF 1 TON—30 FT. 3′ 6″ CENTERS										REMARKS	ANALYSIS OF PIG FROM WHICH STEEL WAS MADE		
		C	Si	S	P	Mn	TONS PER SQ. IN.	ELONG. IN 3 IN.	REDUCTION OF AREA	1ST BLOW RAIL UPRIGHT	2ND RAIL REVERSED	3RD RAIL UPRIGHT	4TH RAIL REVERSED	5TH RAIL UPRIGHT	6TH RAIL REVERSED	7TH RAIL UPRIGHT	8TH RAIL REVERSED	9TH RAIL UPRIGHT		Si	S	P
1	0.55-0.65	0.59	0.019	0.042	0.037	0.77	51.0	12.0	13.4	3¼	...	3 3-16	...	3⅜	...	...	...	...	Twisted at 6th blow no fracture.	0.89	0.13	2.0
2	0.40-0.50	0.49	0.031	0.046	0.065	0.94	52.6	11.0	9.7	3	...	3	...	3	...	3	...	3⅛	Twisted at 9th blow no fracture.	0.93	0.09	2.1
3	0.40-0.50	0.49	0.046	0.04	0.032	0.92	49.7	12.5	11.3	3⅛	...	3¼	...	...	...	...	...	...	Broke on 5th blow.	0.84	0.116	2.1
4	0.40-0.50	0.46	0.046	0.066	0.026	0.816	42.2	13.0	14.3	3⅜	...	3⅜	...	...	...	...	...	...	Twisted 3rd blow no fracture.	0.93	0.085	2.1
5	0.40-0.50	0.43	0.04	0.071	0.048	0.756	40.8	18.0	18.7	4⅛	...	4	...	...	...	...	...	...	Twisted 3rd blow no fracture.	0.70	0.83	2.4
6	0.40-0.50	0.47	0.037	0.038	0.04	0.866	46.0	13.0	16.3	3¼	...	3 11-16	..	3⅜	...	3 3-16	...	...	Twisted 7th blow no fracture.	1.17	0.099	2.2
7	0.40-0.50	0.48	0.031	0.029	0.039	0.855	47.3	13.0	15.3	3½	...	.....	...	...	...	...	...	...	Broke 3rd blow.	0.79	0.113	2.1
8	0.40-0.50	0.45	0.05	0.05	0.061	0.716	43.0	15.5	12.2	4	...	3⅞	...	3⅞	...	3⅞	...	...	Twisted at 7th no fracture.	0.79	0.09	2.4
9	0.40-0.50	0.44	0.035	0.059	0.036	0.723	40.2	16.0	18.8	4	...	3¾	...	...	...	...	...	...	Twisted at 3rd no fracture.	0.75	0.103	2.3

An attempt was made to test all the above to destruction under the drop test, but with the exception of Nos. 3 and 7, it was found practically impossible to do so, owing to the tough nature of the steel, and the twisting of the sample.

NOTES ON ROLLING MILL WORK.

By B. H. Reddy.

In the not far distant past, the only ones about a rolling mill who appeared to know anything of the design of rolls for the production of the various shapes, were the roll turners. When these important persons were asked questions regarding the rolls, that were more than very general in character, the answer was apt to be evasive, to say the least, if it was not refused altogether. They seemed to think their safety lay in surrounding the work with as much mystery as possible. Their disapproval of a set of rolls was equivalent very often to the condemnation without a trial of the same, by the mill superintendent. As an illustration, the writer will use a story told him some years since, by a well-known engineer of many years' experience, who was recounting some of his early trials. This engineer, at that time in charge of the engineering department of a foundry and machine company, introduced several new features in a mill which his company was building for a rolling mill company.

As the members of his company were of the good (?) old kind, he made no mention of the improvements to them, but had the mill built without having the improvements brought to their attention. Although of the firm opinion that the improvements would be successful, he dared not risk the chance of having them condemned without a trial. Fortune favored him, so that the mill was built without any one discovering the radical changes that had been made. Of course the machine shop foreman had to be convinced that the scheme was all right, and after that, everything went along smoothly.

By the terms of the contract, the rolling mill company's boss roll turner was to inspect the mill in the erecting shop, but Providence interposed with an attack of inflammatory

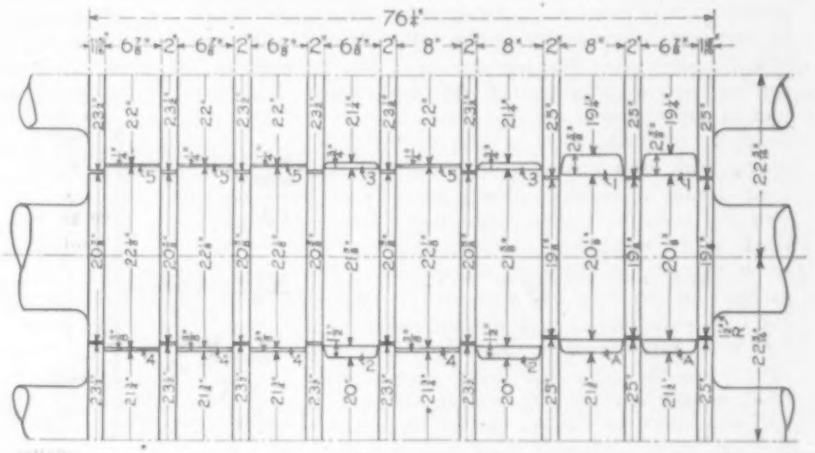


Fig. 1.—Rolls for Making 6¼ or 7⅞-Inch Skelp in Five Passes, Using 4-Inch Billet.

rheumatism, so that the mill was erected on its foundations, and the furnaces heated and charged, ready for the trial, without any one discovering that anything unusual had been done. At this juncture the roll turner

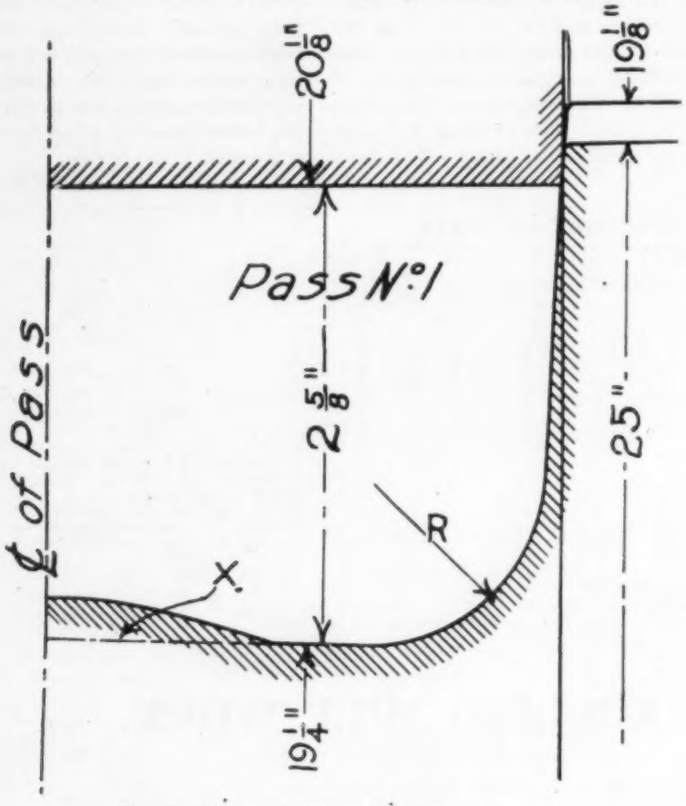


FIG. 2.—FILLET IN FIRST PASS, FULL SIZE.

arrived at the mill on crutches and painfully made his way to the mill. The young engineer knew of the approaching trial, and was anxiously awaiting results, when he received a call from the general manager of his company, who wanted to know what he had done when designing the rolls. When shown the drawing the general manager became excited and told him to order a new set of rolls at a "double rush," and severely scored the young man who had dared to make such a radical change. When asked how the rolls had acted when being tried, he did not know. At last, after some entreaty a telegram was sent, asking how the rolls had worked during trial. On receipt of this telegram the mill superintendent investigated and found the rolls had never been tried, simply because the roll turner had said they would not work. The furnaces were recharged, they having been "dumped" on the floor, and the mill was given a trial. To the joy of the designer, the mill proved itself a success. Nevertheless, he was solemnly told by the general manager to let that experience be a warning, and not try experiments in the future. This will perhaps illustrate the awe in which roll turners and their art were formerly regarded. In recent years the "Art of Roll Turning" has been stripped of its mystery and it is the purpose of this article to describe rolls for the production of flats and as an illustration, a 3-high set of rolls designed by the writer for rolling skelp, will be used. These rolls were designed to roll a 4-inch billet down to ¼ inches thick in five passes, and to replace rolls doing the same work in seven or nine passes. As these rolls were designed to be used in the same housings in which the 9-pass rolls were used,

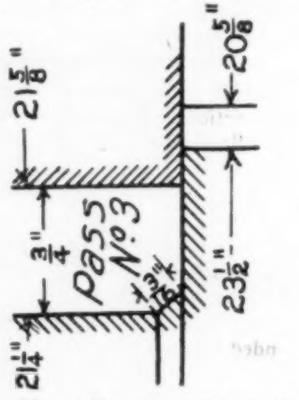


FIG. 3.—MITER FILLET IN THIRD PASS.

they were longer than if they had been designed for a new mill. This was not altogether a disadvantage, as the extra length was used for additional finishing passes, thus giving longer life and greater tonnage to the rolls, before it became necessary to re-turn them. In the rolls shown, it was convenient to arrange them so as to roll two sizes of skelp, viz., 6¾ inches and 7⅞ inches wide.

While the passes are intended to roll skelp that is 6¾ inches and 7⅞ inches wide they are shown on the sketch as 6⅞ inches and 8 inches wide. This to allow for the shrinkage of the hot steel, so that when it is cold it will be of the required width. The average reductions necessary to bring down a 4-inch billet to ¼ inches in five passes would be obtained from the following formula:

$$1-\left(100\sqrt[n]{\frac{a}{A}}\right)=\text{average percentage reduction} \quad \ldots\ldots\ldots (A)$$

Where n = number of passes.
A = area of billet, square inches.
a = area of finished bar, inches.

As the width remains the same in all passes, a and A become the thickness of the different passes. Substituting the values of these in (A).

$$n = 5;\ A = 4;\ a = \tfrac{1}{4}.$$

$$1-\left(100\sqrt[5]{\frac{.25}{4}}\right) = .4256$$

This becomes 42.56 or the average per cent reduction in each pass. However, in this set of rolls these dimensions were not strictly adhered to, and the values given below were used, as the above values are merely approximations.

No. of Pass.	Thickness of Bar, Inches.	Reduction, Inches.	Reduction, Per cent.
1	2⅝	1⅜	34.4
2	1½	1⅛	42.8
3	¾	3¾	50.0
4	⅜	⅜	50.0
5	¼	⅛	33 1-3

These reductions were successfully used, notwithstanding the length of the rolls. The reductions on the middle passes may seem somewhat heavy, but the "spring" or bending of the rolls had the effect of reducing these slightly and increasing those on the end; therefore making them more uniform. The passes marked "AA" are blanks; i. e., the bar does not pass through them at all. On passes 1 and 2, radial fillets are used in the corners, as shown by R, in Fig. 2, which is a full size view of one-half of pass 1. It will be noticed that the bottom of this pass is raised, as shown at "X" (Fig. 2.) This raised portion is used only on the first pass and is deeply scored or "ragged" so as to more readily take hold of the billet and draw it into the pass. After the billet has been shaped in the first pass there should be no further trouble in the bite of the rolls in the remaining passes. In passes 3 and 4 miter fillets are used, as

shown at "B" in Fig. 3. The finishing passes have 1-32-inch miter fillets in the corners.

Another point to be noted is, that it is usually desirable, in designing this kind of rolls, to keep, as much as possible, the diameter of the roll on the top of the pass, slightly larger than the diameter of the roll on the bottom of the pass. This has a tendency to curve the outcoming bar downwards, and thus make it lie closely on the lower guides. This will more surely deliver a flat and straight bar. In the set of rolls shown, this has been done on the lower passes. Grooved rolls, such as are shown, are nearly always provided with guides on the top and bottom of the delivery side of the passes, as shown in Fig. 4. The object of these guides, is to prevent the

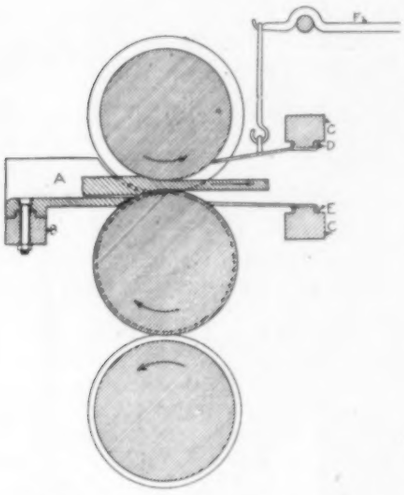


FIG. 4.—STRIPPING PIECES ON ROLLS.

bar from following around the roll. There have been cases where the bar encircled the roll and re-entered the pass. Such an occurrence would be almost certain to break the roll, and even if the mill were stopped before the "collar" completely encircles it, the uneven heating the roll receives before the "collar" can be removed or cooled, will cause it to break sooner or later. This being especially true where the section being rolled is heavy. In Fig. 4 are shown rest bars CC upon which are fastened the guides. The top guide D and the bottom guide E, are similar, except that the top guide has an attachment to suspend it in place. It is counterweighted, either by a weight hung on the lever F, or else by making the lever itself heavy enough to carry the guide. These guides are shown, hooked over both sides of the rest bar. This is for the purpose of preventing the outcoming bar from pushing the guides out and thereby allowing the bar to follow one of the rolls, as well as to prevent the guide from being drawn into the mill, if it, for any reason, be reversed and run in the opposite direction, as is sometimes done. These guides are sharpened chisel-like, on the front end; the bevel being on the side next the roll, and is at such an angle, that the guide bears against the roll only on the point or edge, so that if the bar should stick closely to the roll, the knife-like edge of the guide will cut under it and prevent a collar, by preventing the bar from following around the roll.

If the pass be wide, instead of making the guides wide also, it is preferable to use a number of narrow guides and this is usually done. There are several reasons for so doing, chief among these being the fact that a guide must be made to lie perfectly flat on the face of the roll. With a narrow one this can be much more easily done than when it is wide. In fact, it is practically impossible to satisfactorily use a wide guide under ordinary mill conditions, time, labor, tools and material being the controlling factors. When it is understood that these guides are sharpened by being heated and drawn out under the hammer, the reason for their tendency to warp is at once apparent. Again, should one or more of a number of narrow guides be caught by the outcoming bar, and bent up and thrown out, there may be still enough guides remaining, to turn the bar and prevent a collar or some other highly undesirable accident.

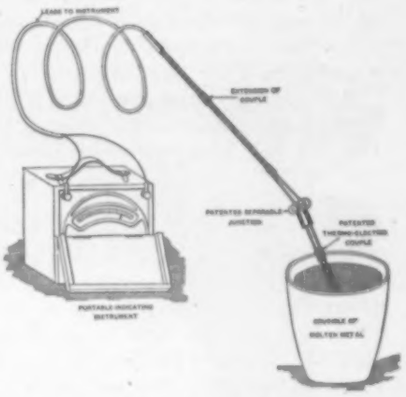
On the entering side a foreplate A is shown, which is bolted to the rest-bar B. The guides, rest-bars, foreplates, etc., on different mills, vary in their details, according to the ideas of the men in charge, so that this article deals with the subject only in a general way, and does not detail the practice in any particular mill. The rolls used as an illustration were designed to suit existing conditions on a hand mill, so that if they were to be designed for a new mill, it is quite likely that they would be altered somewhat. Nevertheless, the general plan would remain the same in any style of mill, for which they are intended.

The machine shop in the factory of W. & J. G. Greey, milling machinery manufacturer, Toronto, was destroyed by fire last week, the loss being about $7,500, covered by insurance.

A PORTABLE PYROMETER FOR TAKING TEMPERATURES OF MOLTEN METAL.

In manufacturing processes and in metallurgical work molten metals and alloys are extensively employed, especially for the making of castings from molds and it is of the utmost importance that the metals be mixed, alloyed and poured at the proper temperatures in order to obtain the best results. The special form of pyrometer illustrated herewith has been designed to meet the practical requirements of every-day shop practice. The portable indicating instrument may be carried in the hand and within two or three seconds the temperature of the molten metal may be taken.

The outfit complete consists of a portable indicating instrument connected to a special thermo-electric couple, the two elements of which are disconnected and left without insulation. When the tips of these elements are



BRISTOL PYROMETER FOR MOLTEN METALS.

slightly immersed into the molten metal an electric connection is made and the reading on the instrument will be the same as if the couple had been originally joined. The general arrangement of the parts forming the outfit for this class of temperature measurements is shown in the accompanying diagram as it would be applied for taking the temperature of a crucible of molten metal just before pouring. The advantage of this plan is that the tips of the wires forming the elements almost instantaneously assume the temperature of the molten metal and time lag error is eliminated. This form of couple has been most successfully applied to the measurement of molten metals as cast iron, copper, aluminum, brass, bronze and other alloys.

When the tip of the couple becomes worn away by the continued use, a fresh portion is exposed to the molten metal and the reading will be the same

as if the couple had not been reduced. A separable junction is provided, as shown in the diagram so that fresh tips can be conveniently applied before enough of the couple has worn away to appreciably affect the resistance and cause an erroneous indication on the instrument. These instruments which are being successfully used by a large number of manufacturers, are manufactured by Wm. H. Bristol, 45 Vesey street, New York City.

SHOPS AT WORK

But Dissatisfaction is Still Rampant at San Francisco.

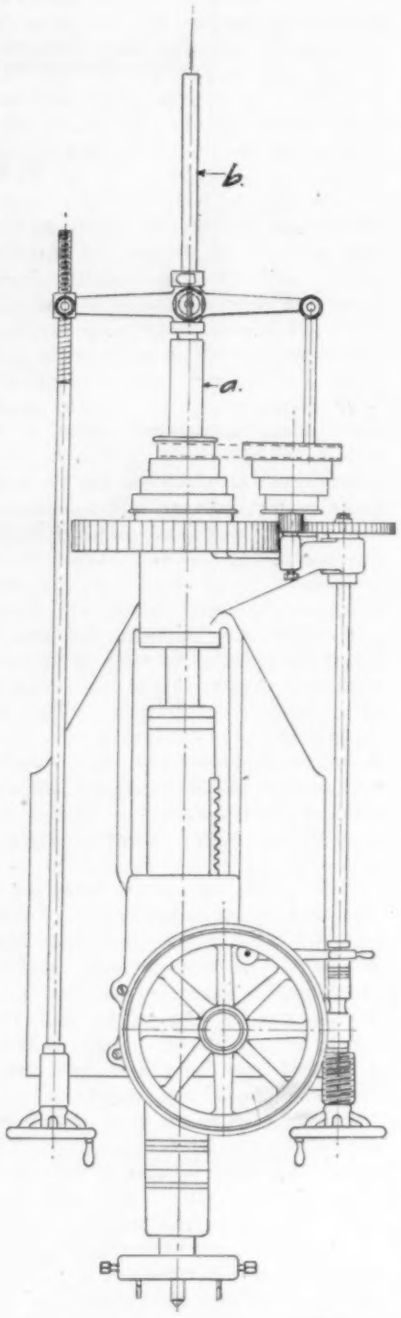
San Francisco, June 20.—The foundries, machine shops, metal works and ship building plants about San Francisco are in operation again. They are not running at "full blast," for the shops have neither the necessary men nor the material. Men and material were scarce in California even before the strike, and a considerable number of the workmen have since left the city. Since May 1, much new work has been diverted from the local shops.

While industrial peace in the iron trades appears assured for at least three years, there is much dissatisfaction on both sides. The professional agitators and the socialists who anticipated a long struggle, taunt the workmen now because they have accepted terms far less favorable than had been offered by the employers but a short time before. The men at work say that they accepted the best terms they could secure at the time and under the circumstances, and that it is far better to accept the eight hour day as a certainty three years hence, than to be fighting now for a nine hour day, as the metal workers are in other sections of the country. The officers of the Iron Trades Council, the central body composed of all the unions engaged in metal work, consider the agreement one of the greatest victories achieved by the iron workers, despite the gradual decrease in the length of the work day in the future. It is the first time that the unions of the iron workers have been recognized. The employers appear perfectly satisfied with what they term "a promise of an eight hour day three years hence." That promise will furnish material for discussion before the United Metal Trades Association of the Pacific coast, which will convene in Portland, Oregon, within the next three days. The metal men of the coast do not approve of the action of the San Francisco employers in yielding to the demands of unions, even to the extent of a promise in the future.

CENTERING ATTACHMENT FOR RADIAL DRILLS.

By Robert Grimshaw.

The illustration shows an attachment which is doing good service in the "Weser" shops in Bremen, and which has for its object, centering the spindle of a radial drill,



Centering Attachment for Radial Drills.

especially when this is used to cut out large circles, as in boiler and tank work. With reference to the illustration, the spindle *a* is axially bored to take in an inner spindle with hardened centering drill *b*; the bearing of the inner spindle is a bronze bushing. The attachment has not only reduced the cost of many piece-work jobs in the shops named, but has enabled doing work on the radial drill which formerly had to be done on special machines. Instead of boring a preliminary centering hole and using a tit drill, or cutters with a centering tit, the work is done in one operation. After the holes for large tubes are flanged over, the same machine is used to mill off the outer edges of the flanges; horizontal cutters are used and the center drill is used as a centering tit, in connection with a cast-iron plate below.

The radial drill is of course arranged so as to take in ordinary drills with Morse or other taper.

The Weser Company has two such attachments arranged on special columns two meters apart and which cut two holes at once in plates where the arms of two radial drills would be in each others' way.

The maker is E. Hettner, Münstereifel, Germany.

TO USE FURNACE GAS.

The waste blast furnace gases from the company's Central furnaces, utilized in four gas engines, will supply the power for the new Cuyahoga mill of the American Steel & Wire Co. at Cleveland. Arrangements have been completed for the installation of four Allis-Chalmers gas engines of about 1,000 horsepower each to develop the power used in the generation of electricity which will operate the new mill. No steam whatever for power purposes will be used in the mill, motors being employed to drive the rolls and other mechanical equipment. The American Steel & Wire Co. in the past has been utilizing some of the waste gas from the Central furnace for power purposes at the Newburg wire mill, but by consuming it under boilers for the generation of steam for steam engines. The same line that is now used to transmit power to the Newburg mill will be used for a similar purpose for the new plant. The grading and excavating work for the new mill is now in progress and it is hoped that operations can be inaugurated by winter.

The Hattie Ensley furnace of the Sloss-Sheffield Co. at Sheffield, Ala., is undergoing repairs and is expected to start up again shortly. The lining of the stack fell in a few weeks ago. It had been in blast for three years and seven months without blowing out, when the lining gave way.

THE PRATT & WHITNEY OPEN TURRET LATHE.

The new Pratt & Whitney 2½ x 26-inch open turret lathe made by the Pratt & Whitney Co., Hartford, Conn., shown in the accompanying illustrations is a universal machine suitable for work covering a large range from the bar and on forgings and castings, and does not require special appliances and expensive cutting tools. In the accomplishment of these features many new ideas have been introduced, including a cross slide turret. The machine is stated by the maker to possess practically all the flexibility and adaptability of the engine lathe. It is extremely rigid, has a powerful spindle drive, quick changes of speeds and feeds and a heavy cross feed turret and numerous adjustable stops. These features permit narrower limits of error, as well as a marked reduction in the cost of work as ordinarily produced.

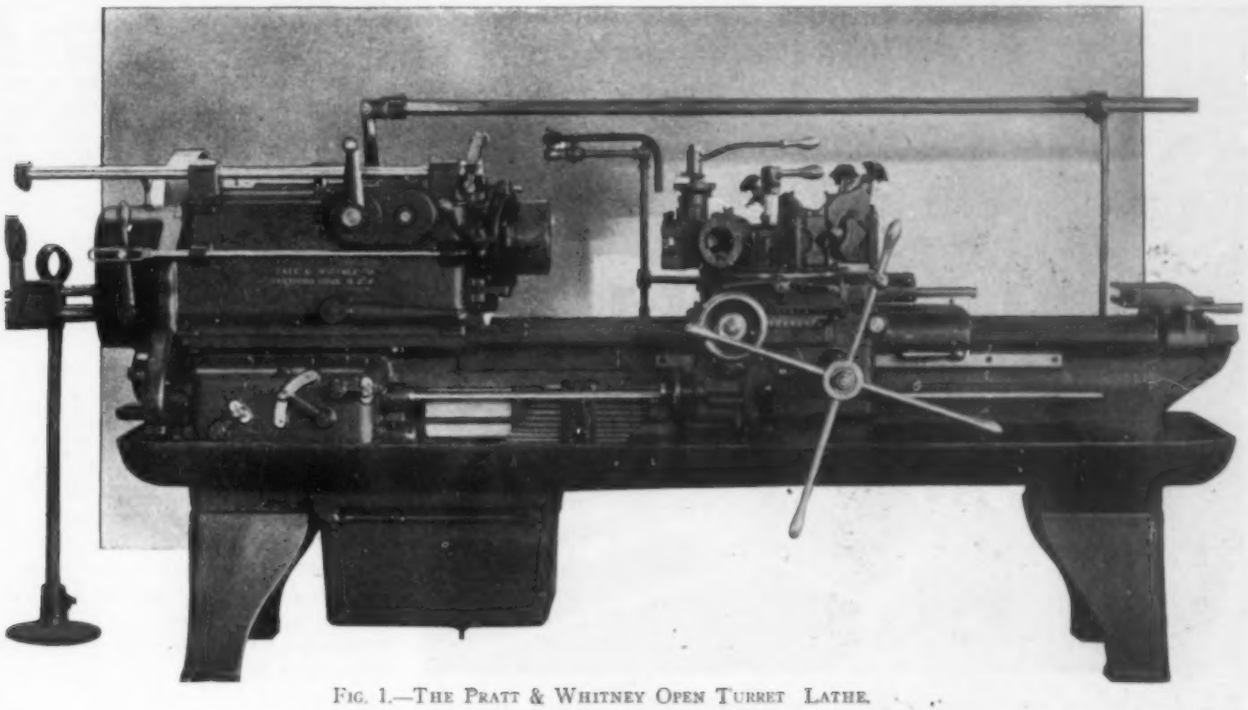


FIG. 1.—THE PRATT & WHITNEY OPEN TURRET LATHE.

The tool has a stiff head with constant speed arranged for either direct-connected motor or countershaft drive, the latter by means of a single pulley. The turret is mounted on a slide, which is capable of both longitudinal and traverse movements by either hand or power. The tool is recommended for, and is adapted to bar work up to 2½ inches diameter and 26 inches long, for castings up to 14 inches diameter and for cylindrical operations on work within these dimensions.

The spindle, which is made unusually heavy, is of special steel and has cylindrical bearings and runs in bronze split sleeves. The thrust of the spindle is taken by an independent upright, cast solid with the head, which insures against any springing tendency under heavy end cutting thrusts. Ample provision is made for taking up the wear of the spindle and end thrust. This spindle can be instantly stopped by the movement of any lever on the headstock. The direction and variation of the spindle to the work holding spindle are obtained by levers operating friction clutches. The gearing is so arranged that it is impossible to connect more than one set of gears with the spindle and main driving shaft at the same time. The gears in the head are of extra heavy pitch and of ample width to safely withstand hard usage, and run continually in oil. The head is stationary and of box construction. Eight variations of speed are provided and by using the 2-speed countershaft this range may be doubled. The operator has all controlling levers and connections within easy reach. The rod chuck is provided with extraordinary gripping power and may be operated with the machine in motion. A particularly desirable feature in forming work from the cross slide is that the collet jaws are supported up to their outer end. The complete chuck can be readily removed from the spindle when a combination lathe chuck or special face plates for castings are to be substituted.

Square, round or hexagonal bars may be used in the machine, or bars of any irregular cross section. These need not necessarily be free from scale, as the machine has no delicate parts nor complicated gearing to become clogged. A positive screw feeding device automatically feeds the bar forward to its stop. For short pieces of stock, a follower bar is furnished, which enables these short lengths to be handled as conveniently as long bars. At the same time the follower bar serves to keep such pieces concentric with the spindle. For gaging the length of stock an efficient stock stop is provided, which, when not in use, is moved forward and swung upward, so as not to interfere with the action of the turret tools.

As heretofore stated, the machine possesses both power longitudinal and cross feeds. The former is positive in both directions and has six changes, any one of which can be instantly set by the movement of a lever. The cross slide is provided with both hand and power feed, there being six variations in either direction. Eight distinct adjustable cross stops are provided, which may be

used in any combination desired.

The construction of the turret is clearly shown in the illustration, Fig. 2. It revolves about a large conical stud held firmly in the cross slide. The various tools may be accurately located on it and have rigid backing, so that the heaviest cuts can be taken without any spring or backward movement. All tools are held in place by straps, and are backed by uprights cast solid with the turret. Severe tests have proven this to be a superior method of unyieldingly holding the tools against all torsional and backward strains. The locking bolt for the turret is directly beneath the cutting tool and is horizontal, thereby overcoming all tendency of a vertical bolt to lift the turret from its seat. Indexing can be accomplished at all positions of the cross slide, and is automatic, although the turret may be rotated to any position by hand. An important feature of this open turret lathe is the compound turret with power and hand feeds and adjustable stops conveniently located. The longitudinal turret slide travels on large raised "Vs," and is provided with gibs to full length and a binder, which permits the slide to be firmly clamped to the bed at any point within its travel. The distance from the axis of the spindle to the turret is altered by traversing the turret slide. This arrangement permits ample support for long bars, and, if the machine is belt-driven, gives an unvarying belt tension. If a motor drive is desired, the motor can be mounted on the head without difficulty.

Six automatic longitudinal stops are provided, together with six supplementary stops, which give two positions to each turret tool. If necessary, all 12 stops may be used for one or all tools in the turret, making it possible to effectively cover all requirements. These stops are held in a heavy steel bracket, which may be moved along the front of the bed and clamped where desired. In case it is desired to run through a few special pieces of work, the automatic stops may be dispensed with and the supplementary stops used in their place without disturbing any adjustments.

The machine is particularly massive and the bed and pan are made in a single casting with U-shaped cross webbing insuring great rigidity. Generous provision for oil and chips has been made. A variety of turret tools adapted to meet all the varous requirements is furnished with this machine.

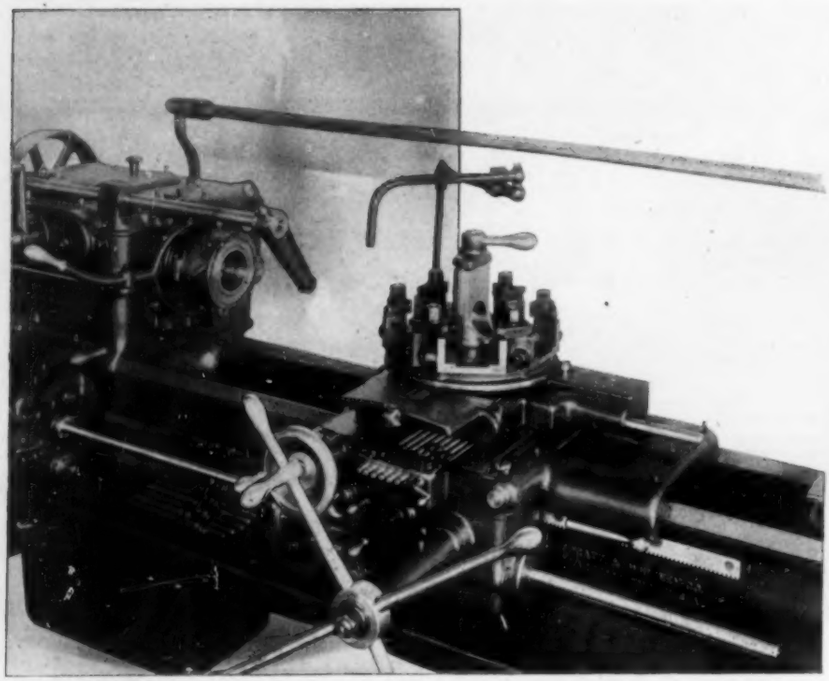


FIG. 2.—CARRIAGE AND TURRET OF PRATT & WHITNEY OPEN TURRET LATHE.

The Statue of Liberty, on Bedloe's island, N. Y., is to be repaired at a cost of $62,800. Contracts have been let, one being to the Otis Elevator Co. for $10,890 for elevator and stairway work. The steel framework of the statue will be painted at a cost of $1,800.

VALUABLE FUEL TESTS.

Recent fuel tests made by the government indicate that it may be possible soon for locomotives to enter cities without emitting smoke of any quantity whatever from their stacks. In the hope that there will be an early solution of what is perhaps the most difficult problem in the elimination of the smoke nuisance of the big cities of the country, these tests are to be continued in co-operation with the government fuel testing plant, at Norfolk, Va., and various railroads.

Recent tests indicate that a fuel made from slack coal pressed into briquettes not only burns almost without smoke, but also evaporates more steam and produces more power under the same boilers than does the same amount of coal.

These briquettes are made by taking the waste or slack coal from mines and mixing it with sufficient tar so that the coal will hold together, the whole being pressed into blocks or cakes.

There are still other cases in which it is claimed that the difference between the prices of lump coal and of the slack are either just sufficient, or scarcely sufficient, to cover the cost of briquette manufacture, but the fact that the briquettes made from such material present certain advantages over the lump coal may enable them to command a sufficiently higher price to provide a margin of profit.

It is claimed of briquettes that they burn with a higher efficiency and with less smoke, because they allow a better circulation of the air and the combustion is more complete and uniform, and they burn with more flame (owing to the added combustible material) and at higher temperature.

Will Abandon Work.—As a sequel to the boilermakers' strike last spring the Chicago Ship Building Co. has announced its intention of abandoning its South Chicago yard as a place for the construction of steamers. The yard will still be maintained as a small repair yard, but the principal work will be done at Lorain, O. The plant has been closed since March 13 when the boilermakers went on a strike in sympathy with the men employed in the Lorain yards. When the strike was called there was in construction a 600-ft. steel steamer for Hawgood & Co., Cleveland. About 1,000 tons of plates had been placed and 2,200 tons were punched and ready for placing. No work has been done on the boat since that time and workmen are now tearing down the plates already in position. They with those already punched will be sent to Lorain.

Stock Activity Continues at a Minimum.

A market totally devoid of interest on the part of investors, and in its range of movement, contracted to a minimum point, continues to represent the situation in security transactions. The past week has shown an acute diminishing of speculative activity and stocks appear to be in a state of torpor. The maximum change in the closing average of 20 active stocks during the week was one of 0.544 per cent on Monday, or a trifle more than one-half a point. On Thursday total transactions were only 176,800 shares, establishing not only a low record for any full day of the current year, but also receding to the lowest business day since the spring of 1905. Saturday's trading was only 55,600 shares, the smallest week's end for many years. Although, at this period of the year, bonds are usually sought after for speculative and investment purposes by reason of anticipation of the July disbursements and reinvestments, a striking inactivity and indifference prevails. Not one day during the week under review showed total bond sales exceeding $1,000.000 par value, an abnormally low limit. Generally the absence of a demand for bonds is attributed to the conditions of the money market and to the calls for capital from other sources. Gold has continued to go out to France this week and on Friday an engagement was announced by London direct, stimulated by the allowance by the bank of England of interest on the shipment while on the way. An increase in the reserve surplus by the New York associated banks was shown by the weekly statement through a reduction in the reserve requirements, even though there was a decrease in the actual cash holdings. The decrease in cash was $710,000, and the reduction in the reserve requirements $1,820,000 through the withdrawal of $7,290,000 in deposits. This made an increase of $1,111,000 in the surplus reserve, and raised the total held by the banks in excess of requirements to $5,626,000, as compared with $10,912,000 a year ago. The present percentage of reserve is unusually low for this season of the year. Call money New York was loaned at a 3 per cent average during the week, against 2½ per cent last week, and 3 per cent for the week of 1906. Sixty day loans New York were 4¼ per cent, against 3¾ per cent last week and 4½ per cent the week of last year. The total sales of 1,224,910 shares on the New York exchange during the week illustrates the dullness that has prevailed. The week previous the sales were 2,458,400 shares, and in the corresponding week of 1906 5,359,750 shares. The total valuation of bond transactions was $3,682,000, compared with $4,291,000 last week and $8,518,000 the corresponding week of last year.

Copper Stocks.

Boston.—Butte Coalition, closed 23; no change in week; Calumet & Arizona, closed 156, net gain 3; Greene-Cananea, closed 15½; North Butte Mining, closed 77½, net gain 1½; Osceola Mining, closed 125, net gain 6; Quincy Mining 112, net gain 2.

New York.—Amalgamated copper, closed 81½, no change.

Financial Notes.

Recent dividend declarations include the following: New York Air Brake Co., regular quarterly dividend of 2 per cent, payable July 21; Garvin Machine Co., regular semi-annual dividend of 3½ per cent on the preferred stock, payable July 1; Westinghouse Electric & Mfg. Co., regular quarterly dividend of 2½ per cent on its preferred assenting and non-assenting stocks, payable July 10; Union Switch & Signal Co., 3 per cent on the preferred stock and 3 per cent on the common stock, payable July 10; Empire Steel & Iron Co., regular semi-annual dividend of 3 per cent on the preferred stock, payable July 1; Crucible Steel Co., regular quarterly dividend of 1½ per cent on the preferred stock, payable June 20; Manning, Maxwell & Moore, Inc., regular quarterly dividend of 1½ per cent, payable July 1; American Ship Building Co., 1¾ preferred, quarterly, payable July 15.

THE LEADING INDUSTRIAL SECURITIES.

	Clos'ng Quo. June 22	Changes in Week	Date 1907 Ann. M't'g	Stock Outstanding	Dividend Basis	Dividend Last Paid	Dividend Date Last Div. Pay
Allis-Chalmers	9¾	− ¼	Sept.	19,820 000			
Allis-Chalmers pr	27½	− ¾		16,150 000	7 cum		Feb., 1904
American Can	5⅛	− ⅛	Feb.	41,233,300			
Am. Can pr	54½	+ ⅜		41,233,300	7 cum	5 Q.	Apr., 1907
Am. Car and Fdy	40¼	+ ⅛	June 27	30,000,000		2 Q.	Apr., 1907
Am. Car and Fdy pr	98½	+1½		30,000,000	7 n. c.	7 Q.	Apr., 1907
American Loc.	56½	− ⅛	Oct. 5	25,000 000		1¾ Q.	May, 1907
American Loc. pr	105	.....		24,100,000	7 cum	1¾ Q.	Apr. 1907
American Ship	77¾	+6¾	Oct. 2	7 600,000	6	1 Q.	June, 1907
American Ship pr	105	+5		7,900,000	7 n. c.	1¾ Q.	Jan., 1907
Am. Steel Foundries	7	.....	Oct. 1	15,810,000			
Am. Steel Foundries pr.	36½	− ½		17,240,000	6 cum		Aug., 1904
Barney & Smith	65	.....	June 4	2,000,000	4	1 Q.	June, 1907
Barney & Smith pr.	128½	.....		2,500 000	8 cum	2 Q.	June, 1107
Bethlehem Steel	11	.....	April 2	14,882,000			
Bethlehem Steel pr.	40	.....		14,900,000	7 n. c.	1¾ Q.	May, 1907
Cambria Steel	36½	− ¾	March 19	45,000,000*	6	3 Q.	Feb., 1907
Cambria Iron	47¼	+ ¼		8,468,000*	4	4 S. A.	Apr., 1907
Chicago Pneumatic Tool	41	.....	Feb. 18	6,145 800	4	4 Q.	Apr., 1907
Colorado Fuel	29¼	.....	Oct. 21	30,132,000		.....	Apr., 1902
Crucible Steel	7⅞	− ¼	Oct. 16	24,578 400			
Crucible Steel pr.	67¼	−1½		24,436 500	7 cum	6	Mar., 1907
Empire Steel	9	−1	Feb. 27	2,281,400			
Empire Steel pr	60	+5		2,500,000	6 cum	3 S. A.	July, 1906
Fay & Egan	100	.....	Feb. 19	1 000,000	6	1½ Q.	May, 1907
Fay & Egan pr.	128½	.....		1,000 000	7 cum	1¾ Q.	May, 1907
General Electric	136½	−1¼	May 14	63 643,600	8	8 Q.	Apr., 1907
Harbison-Walker	11	+ ½	Jan. 21	18,000,000	6	.....	
Harbison-Walker pr.	73	+1		9,800,000	6 cum	6 Q.	Jan., 1907
International Pump	22¼	.....	June 4	17,702,500		2	Apr., 1905
International Pump pr.	68½	+ ⅛		11,350,000	6 cum	6 Q.	May, 1907
Lackawanna Steel	50	−1	March 13	34,971 400		.....	.....
Lake Sup. Corp.	8	− ½	Oct. 2	40,000 000		.....	.....
New York Air Brake	101⅛	+ ¼	June 18	10,000,000	8	8 Q.	Apr., 1907
Niles-Bement-Pond	130	.....	Feb. 6	5,000,000	6	6 Q.	Mar., 1907
Niles-Bement-Pond pr.	105	.....		2,000,000	6 cum	2 Q.	May, 1907
Otis Elevator Co.	35	.....	March 18	6.350 300		3 A.	Apr., 1907
Otis Elevator Co. pr.	87	.....		6,308 500	6 n. c.	6 Q.	Apr., 1907
Penn. Steel	60	.....	May 13	10,750 000		.....	.....
Penn. Steel pr	100	+ ½		18,500 000	7 n. c.	3½ S. A.	May, 1907
Pittsburg Coal Co	11¾	.....	Feb. 11	32 000.000		.....	Nov., 1906
Pittsburg Coal pr.	50¾	.....		32,000,000	7	.....	Apr., 1905
Pressed Stl. Car	32¼	.....	Feb. 20	12 500,000		3	Aug., 1904
Pressed Stl. Car pr.	88⅛	.....		12 500 000	7 n. c.	1¾ Q.	May 1907
Pullman	158¼	.....	Oct. 17	100,000 000	8	2 Q.	May, 1907
Railway Stl. Spring	41⅛	+ ⅜	March 7	13 500,000		4 S. A.	Mar., 1907
Railway Stl. Spring pr.	89½	.....		13,500,000	7 cum	1¾ Q.	June, 1907
Rep. Iron & Steel	25⅜	+ ⅜	Oct. 9	27 191,000		.....	.....
Rep. Iron & Steel pr.	81½	.....		20,416 100	7 cum	7 Q.	Apr., 1907
Sloss-Sheffield	56	+ ⅜	March 5	10,000,000	5	5 Q.	June, 1907
Sloss-Sheffield pr.	92½	−2½		6 700,000	7 n. c.	1¾ Q.	Apr., 1907
Tenn. Coal & Iron	140	.....	May 7	22.553 060	4	4 Q.	May, 1907
U. S. Pipe & Fdy.	34	.....	June 26	12 500,000	4	1 Q.	June, 1907
U. S. Pipe & Fdy. pr	81	.....		12 500 000	7 n. c.	1¾ Q.	June 1907
U. S. Steel	32¾	− ¼	April 15	508,302 500	2 n. c.	½ Q.	Mar ,1907
U. S. Steel pr.	97¾	− ⅛		360,281 100	7 cum	1¾ Q.	June, 1907
U. S. Steel 5's	95⅜	.....		463 708 000	5	5 A.	.....
Va. Iron, Coal & Coke	61	+1	Sept. 17	8,641,000		.....	.....
Westinghouse Elec.	144	+1	July 24	24 998,700*	10	10 Q.	Apr., 1907
Westinghouse Air Brake	147	+1½	Oct. 1	11,000,000*		22½ Q.	Jan., 1907

Par value of shares, $100, except those starred (*), $50.

NEWS FROM MANY INDUSTRIES.

New Buyers:—

The Deeds Machine Co., Ashville, O., has been formed by S. P. Deeds and others with a capital of $5,000.

The United States Corrugating Machine Co., Canton, O., has been organized with a capitalization of $25,000 by C. C. Barrick and others.

With a capital of $10,000 the Lewis Motor & Crane Co., Camden, Me., has been organized by G. E. Allen and R. Robinson, both of the above address.

The Grant Iron Works, Houston, Tex., capital $50,000, has been organized by A. S. Grant, H. A. Paine, Charles G. Guynes, Henry S. Fox and others.

The Kaola Iron & Mica Co., Kansas City, Mo., has been chartered by Edward W. Navue, John R. Downing, A. M. Arnold and others. The capital stock of the company is $200,000.

The Royal Steel Casting Co., Camden, N. J., has been formed by William A. Carr, M. A. Hunter and John A. Hunter. The capital stock of the company is $500,000.

The West End Iron Co., Lebanon, Pa., has been incorporated by Harry F. Mattern, Samuel J. Shubrooks and Lloyd Glick. The capital stock of the company is $10,000.

The Browning Foundry Co., Ravenna, O., has been incorporated with a capital of $150,000 by W. S. Krake, W. H. Marsh, E. R. Taylor, G. H. Robinson and R. L. Hawkins.

The James Iron Works, Buffalo, N. Y., has been chartered with an authorized capital of $20,000 by Frank R. James, Emma S. Bennett, 70 Ashland avenue; Avery C. Wolfe, 755 Richmond avenue, all of Buffalo.

The Wallace Machinery Co., Champaign, Ill., has been chartered with an authorized capital of $50,000 to manufacture machinery. Those interested are: J. D. Wallace, L. B. E. Wallace and A. D. Mullikan.

The R. & H. Mfg. Co., Brockton, Mass., capital $100,000, has been chartered by Richard W. Randall and Everett A. Hunt, both of Brockton. The company will manufacture electrical apparatus and machinery.

Articles of incorporation have been filed by the Southern Pipe & Foundry Co., Knoxville, Tenn., with a capital of $50,000. Those interested are: Frank S. Mead, Hugh M. Houk, J. G. Simpson, John C. Houk and W. E. Moses.

Articles of incorporation have been filed by the Cyclone Grate Bar Co., Buffalo, N. Y., to manufacture grate bars, etc., with a capital of $25,000. Those interested are: Alexander H. Hatfield, D. Maxson Estee and Albert W. Plumley, all of Buffalo.

The Harrington Signal Co., New York, capital $50,000, has been organized to manufacture railroad materials, devices, etc., by Edward M. Tierney, Marlborough hotel; George W. Sweeney, Victoria hotel; Samuel H. Harrington, 120 Liberty street, all of New York.

The Half Minute Edger Co., New York, has been incorporated with a capital of $100,000 to manufacture sharpening tools and implements by James H. Reinhardt, East Orange, N. J.; William H. Van Wart and William S. Moore, Brooklyn; James J. Kienan and Theodore F. Bourne, Montclair, N. J.

The Erie Coke Co., Sharon, Pa., has been organized with a capitalization of $300,000 by Charles E. Pope, of Cleveland, formerly connected with the National Castings Co., and T. S. Clark, of Erie, formerly vice president of the Sharon Steel Hoop Co. The other directors are: W. W. Darley and M. E. Rothberg, of Pittsburg, and Charles E. Shenk, of Erie. H. N. Fleming, of Erie, is treasurer of the company.

New Construction:—

The Columbus Iron & Steel Co., Columbus, is remodeling and enlarging the office building at its plant.

The pipe shop and machine shop now being erected by the Vilter Mfg. Co., Milwaukee, will replace the building destroyed by fire about a year ago.

The American Steel & Wire Co. proposes to rebuild, along the old lines, the cooper shop of its Braddock, Pa., plant, which was recently destroyed by fire.

Extensions are now being made to the plant of the Riverside Engine Co., Oil City, Pa. The buildings will be of concrete and steel construction, and it is expected that the additions will be completed and in operation by Sept. 15.

The Independent Pneumatic Tool Co., Chicago, is contemplating the doubling of its manufacturing facilities, the company reporting a large increase in its business over last year. Recently the plant at Aurora, Ill., was considerably enlarged by the installation of a large amount of new machinery.

The Detroit Iron & Steel Co., Detroit, an interest of M. A. Hanna & Co., at its annual meeting decided to duplicate its present blast furnace plant by the construction of a large new stack. Work on the improvement will be commenced at once. At the meeting the officers and directors of the company were re-elected.

The Conley Frog & Switch Co., Memphis, Tenn., is erecting a plant 70 x 200 feet of concrete and steel construction. The main building is about completed, the machinery has been ordered and the contract calls for its delivery before Aug. 1. The company will manufacture frogs, switches, crossings, switch stands, rail braces, etc.

The Flour City Ornamental Iron Works, Minneapolis, Minn., whose foundry building was recently destroyed by fire, is pushing the rebuilding of the damaged portion of its plant. The new foundry will be of fireproof construction 100 x 200 feet. Temporary arrangements have been made for turning out a limited number of castings, and as the fitting shops and other buildings of the plant were not damaged to any great extent, the work on pending contracts has not been interrupted except in the one department.

The Ohio Foundry Co. and the Sterling Electric Motor Co., Dayton, O., which are controlled by the same interests, will move into the new plant of the latter about July 1, and will manufacture electric motors and generators as in the past. The machine shop of the new plant is a one and two-story brick building 112 x 178 feet, for which the additional equipment required has been bought. The company will be in the market in the near future, however, for an additional boring machine and a 30 or 36-inch engine lathe. The foundry is 142 x 270 feet, two stories. The cupola, blower and other machinery for this portion of the plant have been purchased and already installed.

The Standard Welding Co., Cleveland, is now engaged in erecting an entirely new plant on West Seventy-sixth street, N. W., which will double the capacity of its present plant on Seventieth street, S. E. The new plant will contain about 2¼ acres of floor space and will consist of manufacturing buildings 50 x 400 feet, three stories and 75 x 425 feet, one story, together with a power house sufficiently large to accommodate a 1,500-horsepower plant. Part of the equipment needed for the new shops has

been purchased, but the company is still in the market for a general line of machinery, including elevators, traveling cranes, motors, dynamos, boilers, engines, etc. It is expected to have the new plant in operation by Dec. 1.

General Industrial Notes:—

The Canton Boiler & Engineering Co., Canton, O., is now capitalized at $50,000, an increase of $20,000 having been made.

At the annual meeting of the stockholders of the New York Air Brake Co., New York, the old board of directors was re-elected.

The plant of the Acme Wire Co., Cuyahoga Falls, O., has been purchased at trust sale by L. W. Brown, of Akron. It is planned to operate the plant with increased capacity.

The Columbus Plow Co., Columbus, O., is perfecting a new plow for tearing up brick streets. This will be a great saving to contractors, as the paving brick now has to be pried up by use of bars.

The Quad Stove Mfg. Co., Columbus, O., has moved into its new plant 50 x 150 feet, two stories, which has been equipped with the latest machinery and made strictly up-to-date.

The Alan Wood Iron & Steel Co., 519 Arch street, Philadelphia, has purchased additional acreage adjoining its Ivy Rock steel plant, but states that press reports with reference to extensions have been unauthorized.

The extensive increase in its business has forced the G. M. Yost Mfg. Co., Mechanicsburg, Pa., manufacturer of vises, to add considerably to its equipment. The company is now in the market for a 20 or 22-inch engine lathe, with terret on shear, a 1½-inch bolt cutter, a No. 3 milling machine and a tool room grinder.

The Cutler-Hammer Mfg. Co., Milwaukee, builder of electric controlling devices, has purchased the property of the Wirt Electric Co., Philadelphia, and will continue the manufacture of the Wirt apparatus. The purchase of the Wirt company will enable the Cutler-Hammer company to meet more fully the requirements of its trade.

The C. G. Dauber Machine Co., Oshkosh, Wis., recently incorporated, will manufacture Dowel door machinery, including an upright automatic door clamp, stile and rail borers, Dowel stickers, drivers, gluers, etc. The company is already doing good business in the central and western states, and plans to operate through agencies in all parts of the country.

At the annual meeting of the Brier Hill Iron & Coal Co., Youngstown, O., the following officers were elected: President, H. H. Stambaugh; vice president, R. C. Speese; treasurer, George Tod; general manager, Thomas McCaffrey. The stockholders and directors inspected the plant of the company at Brier Hill, Pa., and found it to be in a very satisfactory condition.

The Kokomo Steel & Wire Co., Kokomo, Ind., at its annual meeting elected A. A. Charles, president; A. V. Conradt, vice president; J. E. Frederick, secretary; G. W. Charles, treasurer, and Thomas Harris, superintendent. These officers with Richard Ruddell, Kokomo; C. C. Shirley, Indianapolis, and E. T. Taylor, Huntington, constitute the board of directors.

The Paxton & Vierling Iron Works, Omaha, Neb., at its annual meeting elected the following directors: W. A. Paxton, C. J. Vierling, Louis Vierling, A. J. Vierling and W. A. Paxton Jr. The officers chosen are: W. A. Paxton, president; C. J. Vierling, vice president; Louis Vierling, secretary and treasurer, and A. J. Vierling, manager. Robert Vierling, one of the founders of the firm, died during the year.

The Putnam Motor Mfg. Co., 57 Lebanon street, Springfield, Mass., recently organized, for the present will manufacture from a 30-pound cycle motor up to four-cylinder automobile and marine motors, besides building a float feed carburetor and a kerosene attachment for starting and running motors on kerosene without interfering with the use of gasoline as a fuel. No buildings will be erected at present. R. H. Putnam is president of the company.

The Taylor-Shantz Co., Rochester, N. Y., recently organized, will design and build special machinery, especially that requiring fine work. The company will also make high grade tools and dies and later expects to place on the market machine tools of its own design. The company has taken over the plant and entire equipment of the Monroe Tool Works, and has added new equipment. Further improvements are expected to be made in the near future.

At the meeting of the stockholders of the Safety Meter Lock Co., Columbus, O., it was decided to change the name of the corporation to the Ohio Brass & Iron Mfg. Co., and to increase the capital stock from $50,000 to $75,000. To the iron castings foundry now operated it is proposed to add a brass foundry for general brass casting work. The directors elected are: George T. Spahr, W. T. Goodwin, A. J. Pray, F. C. Kingsbury, J. B. Orbison, Frank J. Macklin and M. Loofbourrow. The board organized by electing Frank J. Macklin, president; F. C. Kingsbury, vice president; A. J. Pray, secretary, and M. Loofbourrow, treasurer.

The Webb City & Carterville Foundry & Machine Works, Webb City, Mo., recently incorporated, has completed its organization as follows: President, W. R. Caulkins; vice president, T. S. Coin; secretary and treasurer, H. B. Owens; general manager, W. G. Bryant; assistant manager, George Kessler; superintendent of the Oronogo department, J. N. Bonsall; superintendent of the Carterville department, S. B. Loomis; superintendent of the Joplin department, Edward McDonald; superintendent of the Webb City department, George Kessler. The members of the board of directors are: T. S. Coin, W. F. Bryant, George Ball, Edward McDonald, J. N. Bonsall, George Kessler, Thomas McCrosky and W. R. Caulkins.

The Cincinnati Pulley Machinery Co., Cincinnati, recently organized, will manufacture Streit pulley machinery, having purchased the entire interests in this line, including all drawings, patterns, etc., and expects to build this machinery exclusively. The Streit Co. is now engaged in building automatic gas engines. L. B. Patterson is president and treasurer and J. G. Hey, vice president and general manager. These officers with D. P. Hopkins, resident manager of the United States Cast Iron Pipe & Foundry Co., Addyston, O.; A. E. Patterson, confidential man for D. L. Carpenter & Co., and Joseph A. Scallan, of the firm of Wirthlin & Scallan, machinery supply dealers, form the board of directors.

The Anderson Foundry & Machine Co., Detroit, Mich., has about completed the installation of additional equipment for manufacturing drop forgings, crank shafts and tools. The plant is now equipped with 21 hammers of various styles, enabling the company to manufacture a large range of drop forgings for machinery and automobile manufacturers. The new steam hammer installed, in addition to those already in use, enables the company to do a considerable amount of large general forging. At the present time, in additional to working the ordinary grades of open-hearth steel, it is manufacturing crank shafts of nickel, chrome nickel and vanadium steel. A new building, 40 x 150 feet, two stories high of heavy construction, especially arranged for die making, has been erected.

Trade Notes:—

The Northern Engineering Works, Detroit, has recently furnished the General Electric Co., Schenectady, N. Y., foundry department with an 84-inch Newten cupola, with stack 74 feet high. This cupola will have a capacity of 16 tons per hour.

The Morris County Machine & Iron Co., Dover, N. J., has completed the shipment of two sets of 36 x 36-inch crushing rolls with a capacity of 200 tons per hour of the Benson Mines Co., Benson Mines, St. Lawrence county, N. Y.

The Reeves & Skinner Machinery Co., New York, has been organized for the purpose of selling the products of the Alberger Condenser Co., the Alberger Pump Co. and other agencies, principally handling pumping machinery of various makes. The company will maintain offices in the Chemical building, St. Louis. The officers are: W. H. Reeves, president; W. S. Doran, vice president; B. W. Pierson, secretary, and Ramsey Skinner, treasurer.

The Wetherill Finished Castings Co., Philadelphia, announces that it has moved its office temporarily to the northeast corner of Twelfth and Cumberland streets.

The firm of R. L. Ginsburg & Sons, of Detroit and Buffalo, will be succeeded July 1 by a corporation to be known as the R. L. Ginsburg Sons' Co., with offices located at both Detroit and Buffalo as heretofore. The new corporation will take over all the assets and liabilities of the present concern.

Fires:—

The wire weaving plant of the Wisconsin Wire Co., Appleton, Wis., was heavily damaged by fire June 14. The loss is about $15,000.

The foundry of Bertsch & Co., Cambridge City, Ind., was destroyed by fire June 16, causing a loss of valuable patterns. The remainder of the plant was not damaged.

The warehouse and machine shops of the Rock Island Stove Works, Davenport, Ia., were damaged to the extent of $1,500 June 13.

The New York Assembly has passed by unanimous vote a measure forbidding the police commissioner of New York from clothing strikebreakers with the powers of peace officers. The idea is to prevent organizers of strikebreakers from contracting to furnish men and then have them sworn in as temporary peace officers.

TRADE PUBLICATIONS

Steam Specialties.—The Strong, Carlisle & Hammond Co., Cleveland. 6 x 9 inches. 31 pages. This catalog describes the Squires steam specialties, including steam traps, reducing valves, pump governors, etc. In addition to the description of the devices listed, directions for their installation are given.

Storage Batteries.—The Westinghouse Machine Co., Pittsburg. 4½ x 6 inches. 50 pages. This catalog is devoted to a brief description of the construction of the Westinghouse storage battery, and then presents illustrations of the various types of batteries manufactured. These are suitable for general power purposes, railroad use, car lighting, signal work, etc.

Pipe Flanges.—The American Spiral Pipe Works, Chicago. 8 x 10¼ inches. 93 pages. This catalog presents illustrations, dimensions and information concerning forged steel pipe flanges for heavy duty. The specific flanges listed are the extra heavy high hub, extra heavy companion flange, standard companion flange, welding flange, boiler flanges, both standard and extra heavy and for double riveting, tank flange, riveted pipe flange, A. S. M. E. standard, riveted pipe flange for the R. P. manufacturers. In addition, information and sizes are given regarding corrugated copper and annealed steel gaskets, wrought iron pipe and standard riveted pipe.

Electric Traveling Cranes.—The General Pneumatic Tool Co., Montour Falls, N. Y., is distributing Bulletin No. 58, descriptive of its Shepard cranes and hoists. The various problems of crane construction are considered in detail, being treated under the headings: Trolley, hoist gearing, load brake, electric brake, automatic switch limit, trolley drive gearing, bridge motor gearing, bridge foot brake, bridge truck gearing, bridge trucks, bridge, operator's cage, controllers, motors, hoisting cable, load block and lubrication. This is followed by suggestions as to the style of crane suited for particular tasks and as to how measurements should be taken and orders placed. Several views of cranes in place complete the bulletin, which comprises 20 pages, 9 x 12 inches.

Drill Chucks and Power Transmission Machinery.—The J. R. Almond Mfg. Co., 83 and 85 Washington St., Brooklyn, N. Y. 30 pages. 5 x 7½ inches. Describes the various sizes and styles of drill chucks, right angle transmission, turret heads, flexible steel tubing, etc., manufactured by this company. Specifications and tables of dimensions are also given.

Electric Motors.—The Barrett Electric Mfg. Co., Cincinnati. Bulletin No. 5. Ten pages. 7½ x 10 inches. Describes and illustrates and presents tables and dimensions of electric motors and generators from ½ to 20 horsepower.

Surplus Increased.—At the annual meeting of the United Shoe Machinery Corporation, a surplus of $11,126,349, compared with $8,774,605 in 1906, was shown. The statement of resources and liabilities as of March 1, 1907, showed $32,398,142 of resources, as against $26,486,987 in 1906, an increase of $5,911,155. It is reported that the number of machines out under lease in this country on March 1, 1907, was 57,777, an increase for the year of 8,877. At the meeting the retiring board of directors was re-elected.

FOREIGN TRADE OPPORTUNITIES.

(These inquiries from prospective foreign purchasers are furnished by American consuls to the Government Bureau of Manufactures, Department of Commerce and Labor. Those in which the addresses are omitted are on file at the Bureau of Manufactures, Washington, D. C. In applying for addresses refer to the file number.)

No. 1010. Panama Canal supplies.—The Isthmian canal commission, Washington, invites proposals to furnish steel rails, splice bars, tie plates, track bolts and spikes, nut locks, car wheels, white oak, piles, etc. (Circular No. 365.)

No. 1057. Steel roofing and metal ceilings.—Consul E. E. Young writes as follows from Harput, Turkey: There is a fair demand in this consular district for steel roofing and metal ceilings. Many of the larger buildings in this city are now roofed with American steel roofing, and orders have been sent to supply other buildings now in the course of erection. The greater expense of steel roofing as compared with tiles is more than offset by the durability of the former. American manufacturers of steel roofing and metal ceilings are requested to send catalogs, with letters of advice as to terms of sale, etc., to this consulate.

No. 1060. Automobile materials and metals.—An American consular officer in Germany writes: A representative here of foreign manufacturers of automobile materials and metals would like to correspond with large manufacturers of copper, steel, and iron in America.

No. 1063. Railway construction.—The Public Works Department, Madrid, Spain, invites bids until July 30 for the construction of a railway from Santiago de Composella to Corunna-Lugo line. Deposit required, $22,000. Government subsidy about $10,300 per kilometer (0.62 mile). Address Direccion de Obras Publicas Ministero de Fomento. (A.)

No. 1071. Machinery.—Eugene Rigaut, 23 Rue de Bonnel, Lyons, France, writes: I should be most happy to become an intermediary between American and French business houses. The products which interest me at present are machinery and tools for working wood and metal, refrigerating and ice-making equipments, and all kinds of apparatus used in making chocolate, confectionery, cakes, crackers, etc.

No. 1083. Railway contractors' supplies.—The six contractors for the construction of the Servian State railway are named by Consul Moorhead. He says that American exporters of contractors' supplies, drilling machinery, etc., should write in German to these contractors.

IN THIS ISSUE: The American Society for Testing Materials at Atlantic City.---Discussion of Steel Rail Breakages.

THE IRON TRADE REVIEW

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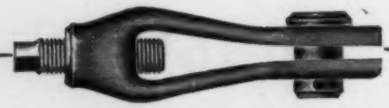

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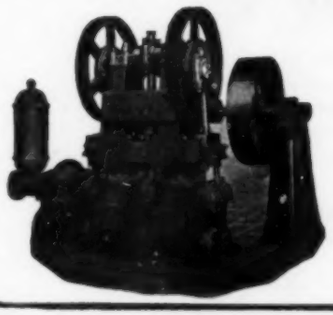

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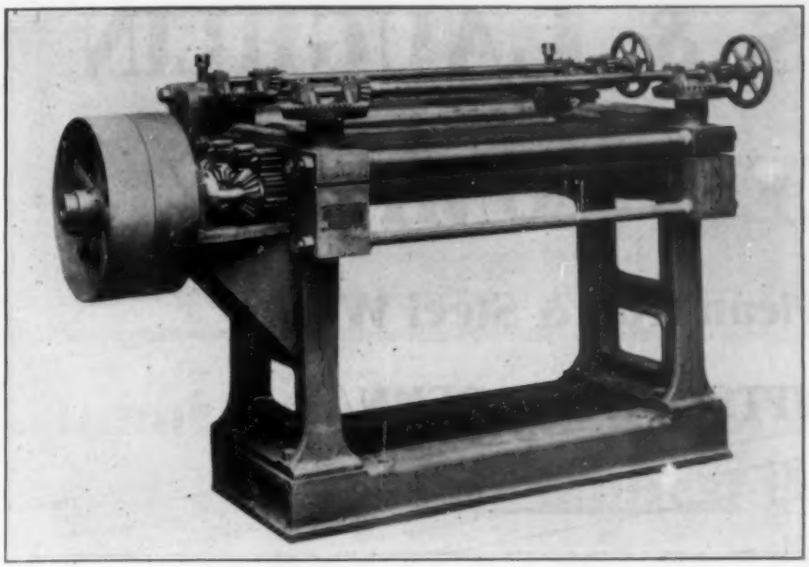

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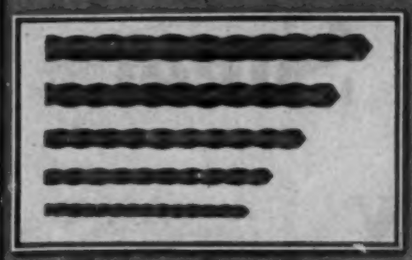

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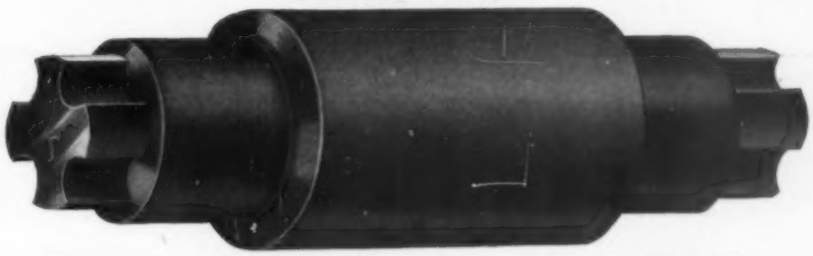

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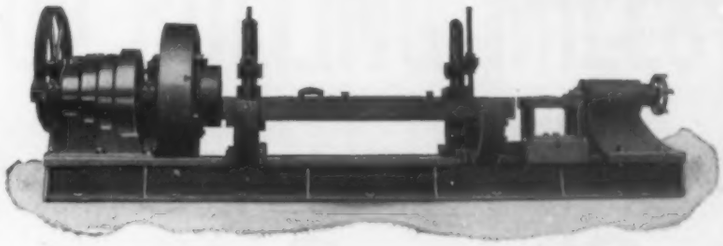

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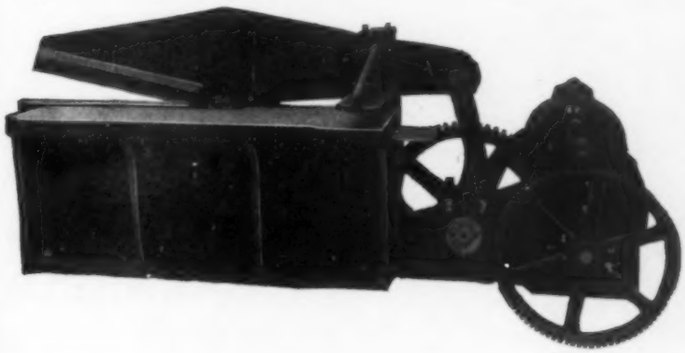

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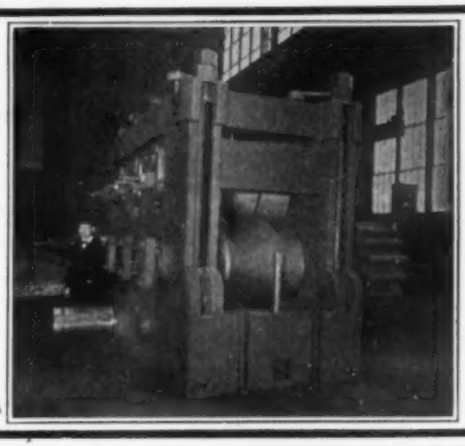

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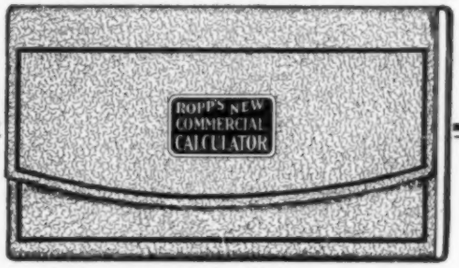

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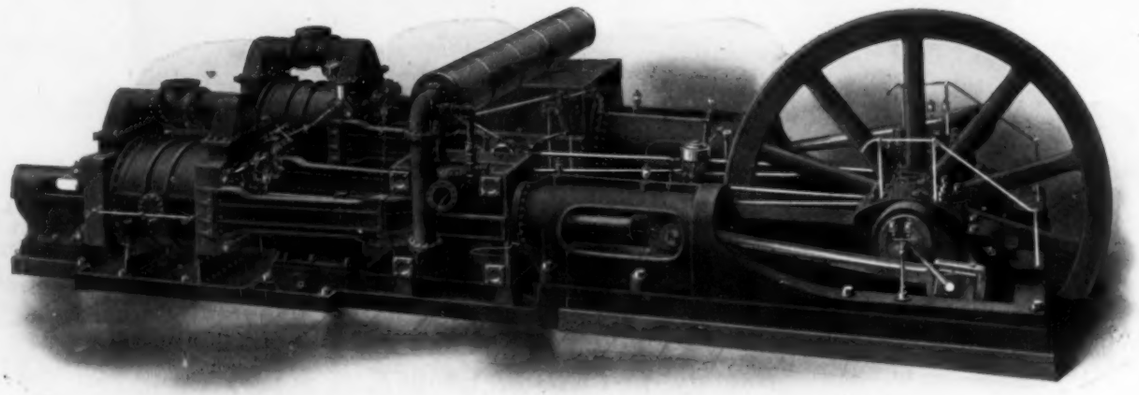

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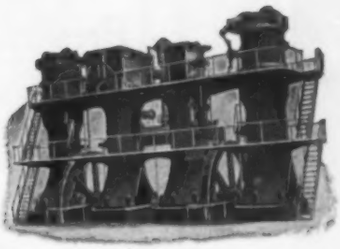

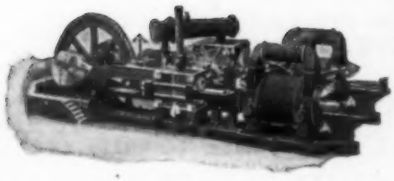

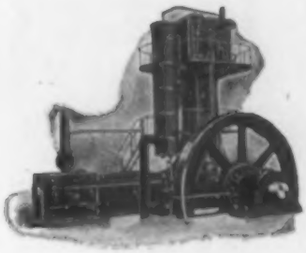

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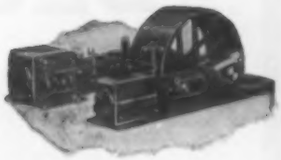

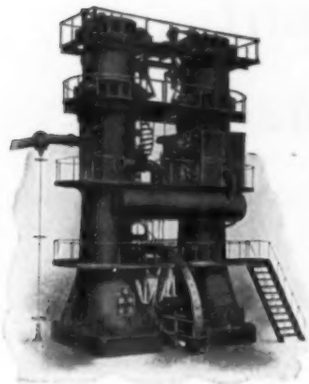

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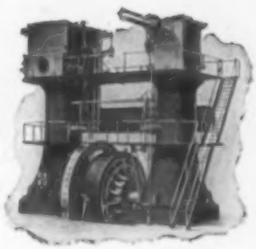

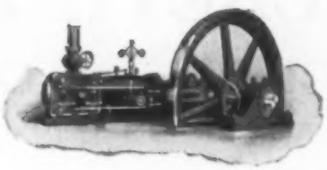

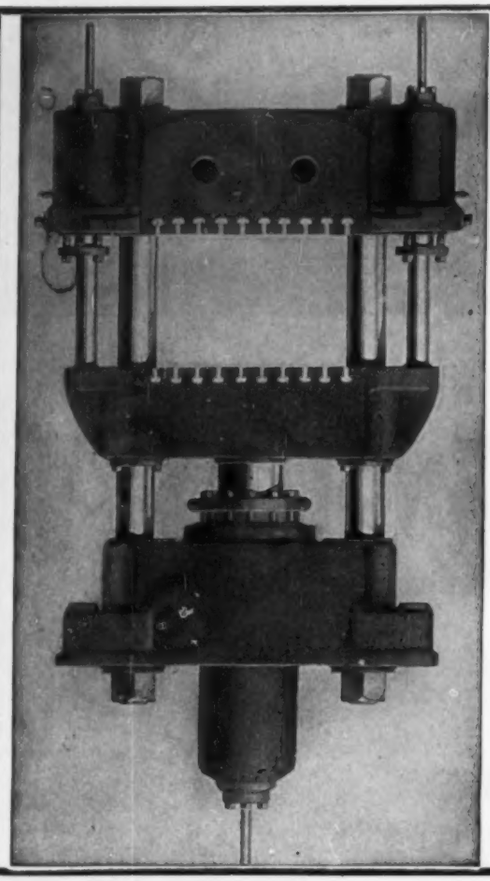

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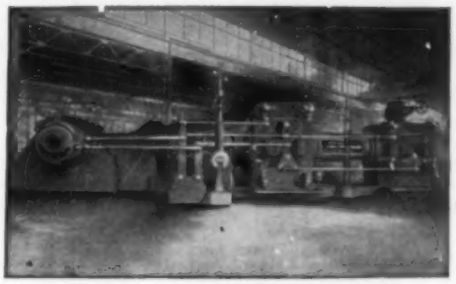

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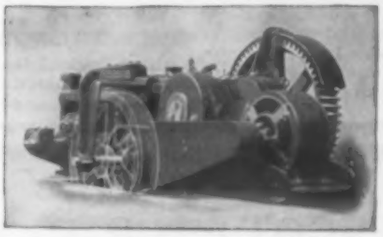

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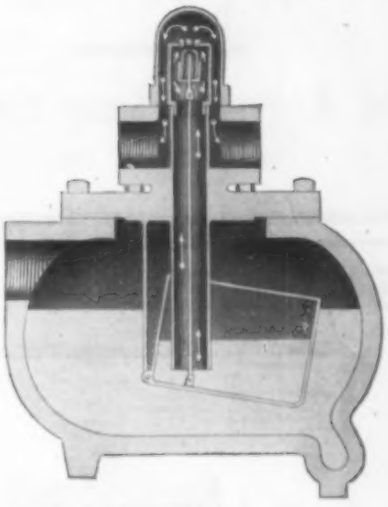

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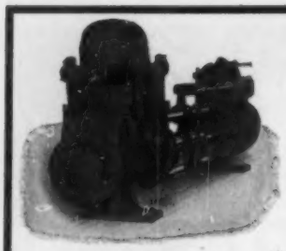

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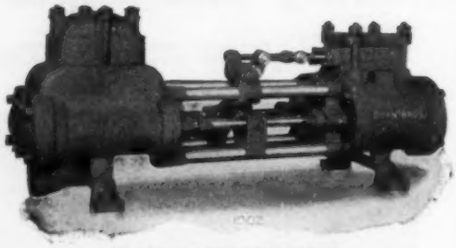
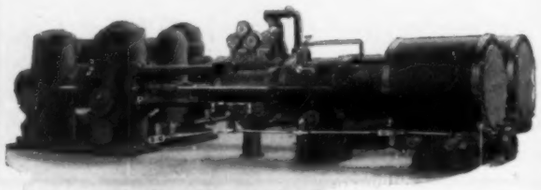


DURABLE DUPLEX PUMP

PRESCOTT TRIPLES

ASK the mines using them



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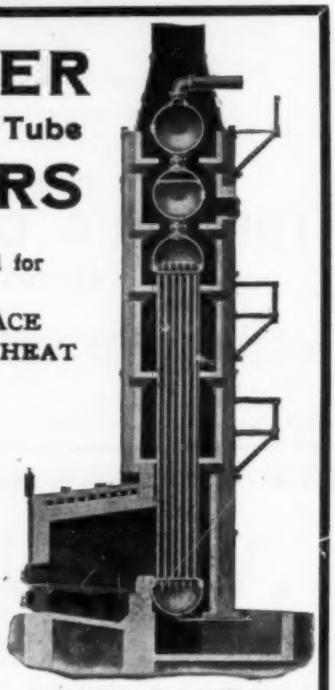

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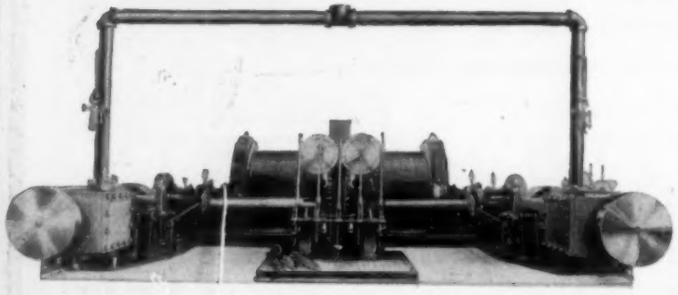

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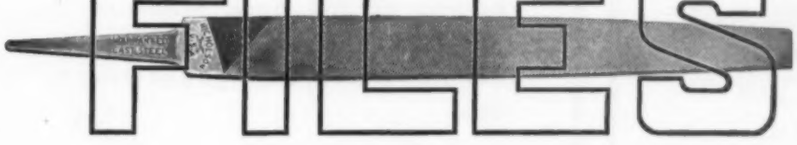

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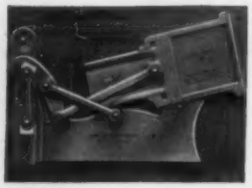

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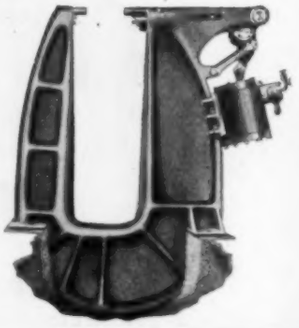

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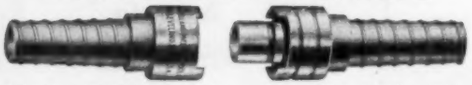

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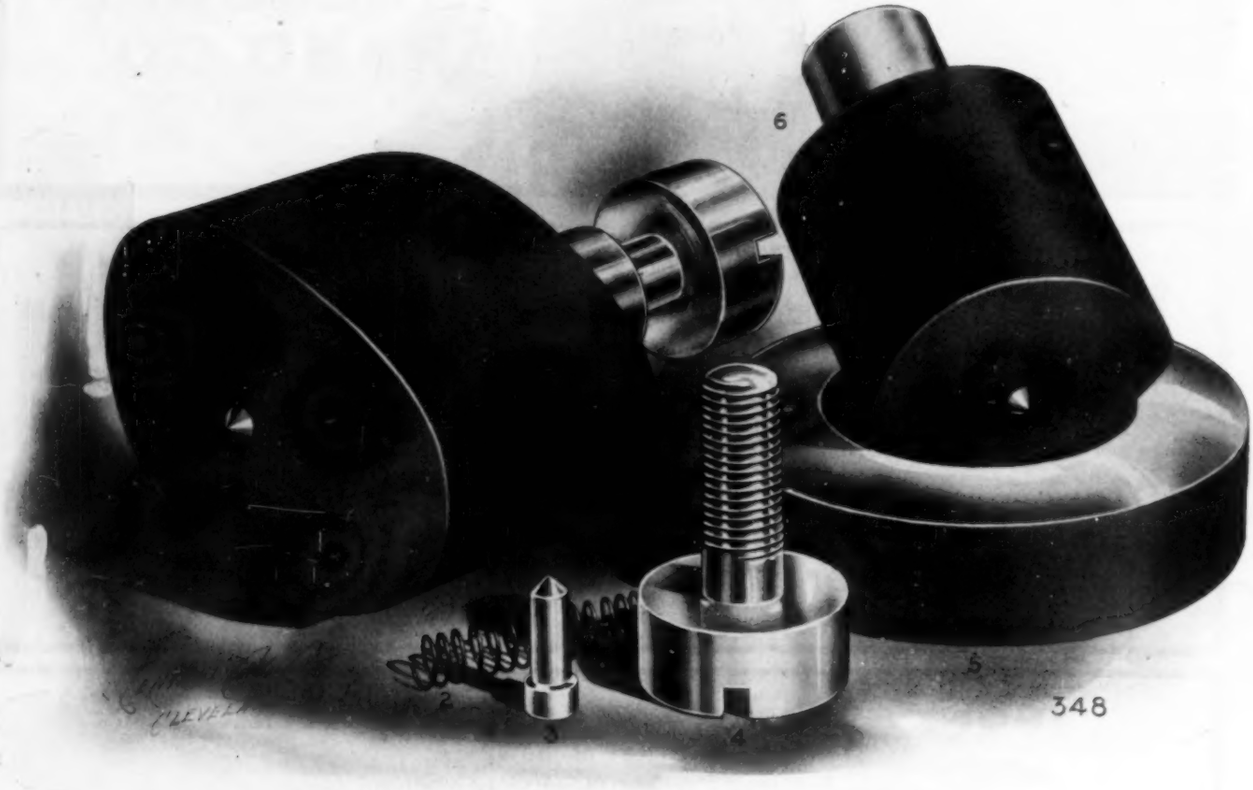

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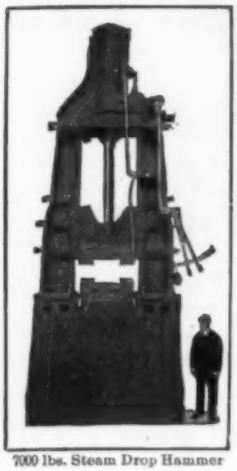

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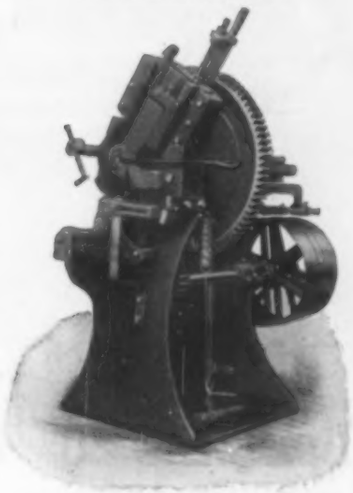

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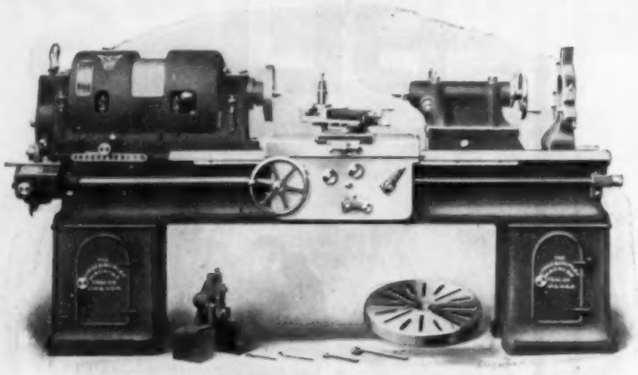

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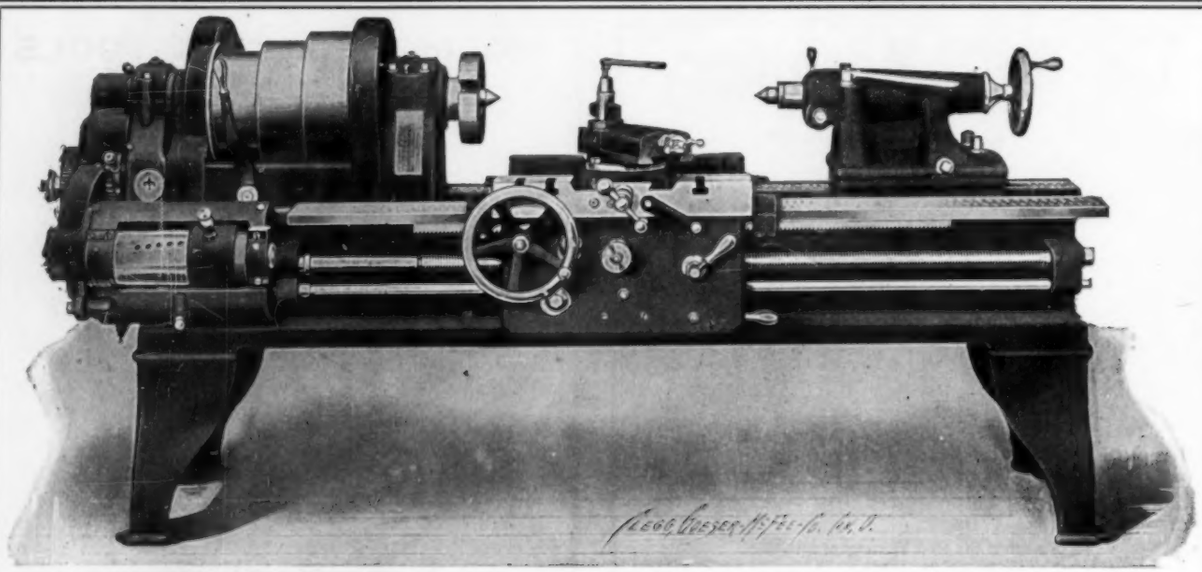

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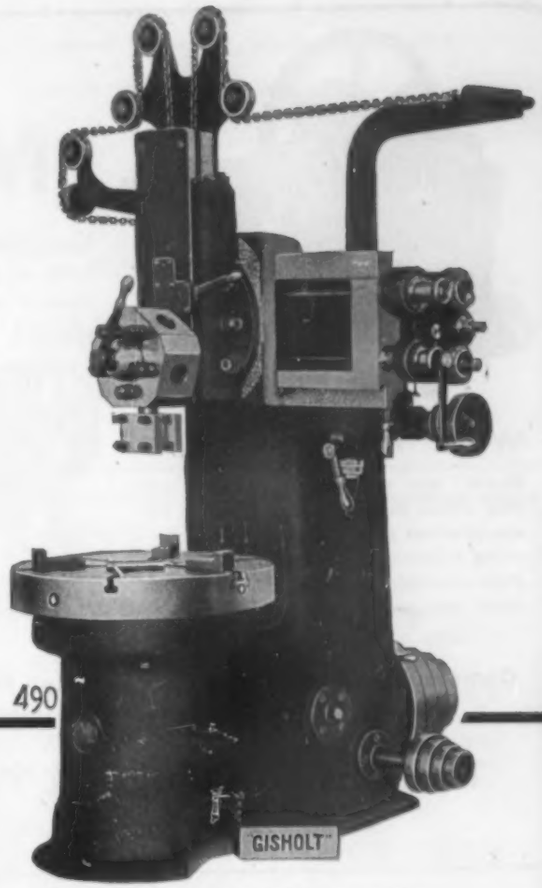

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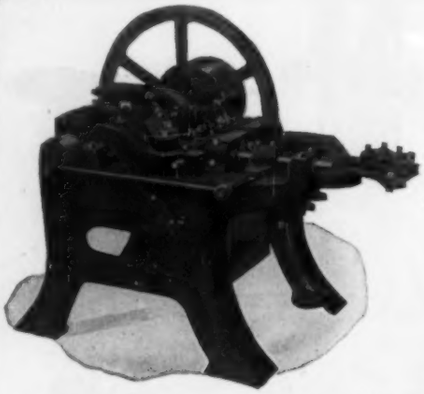

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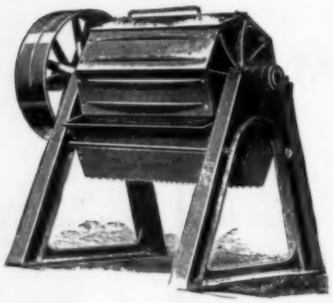

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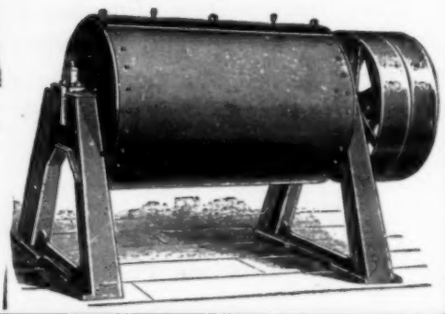

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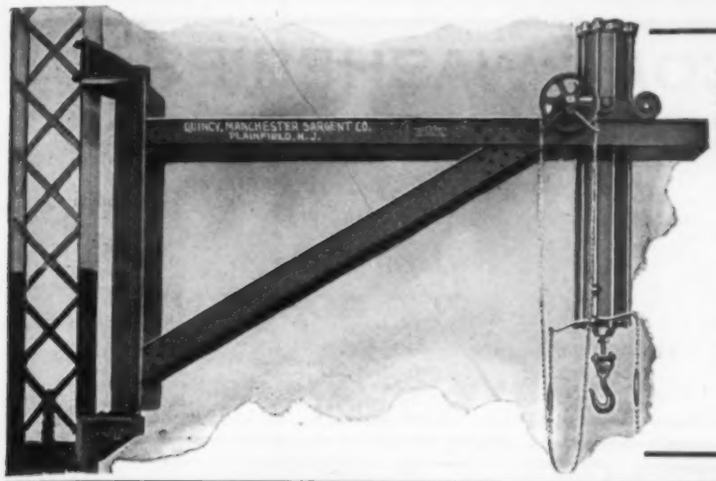

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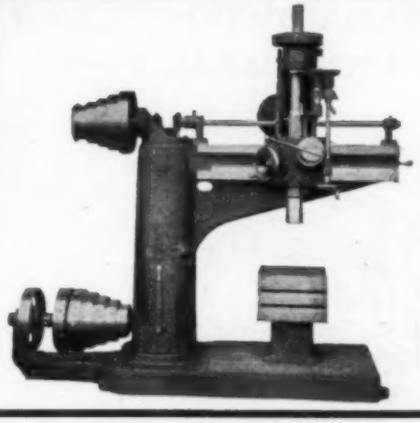

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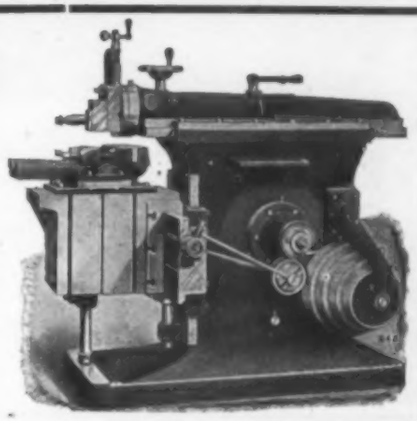

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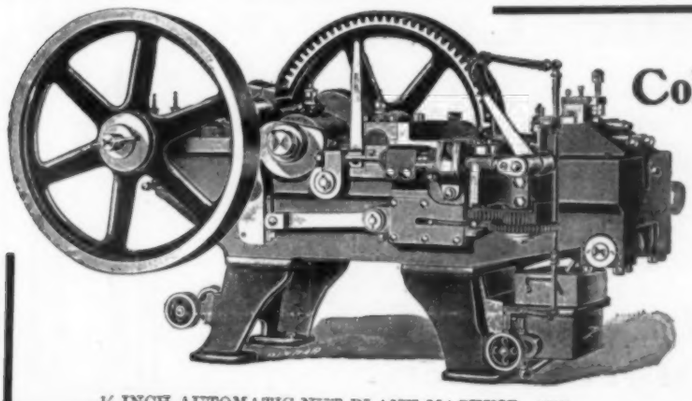

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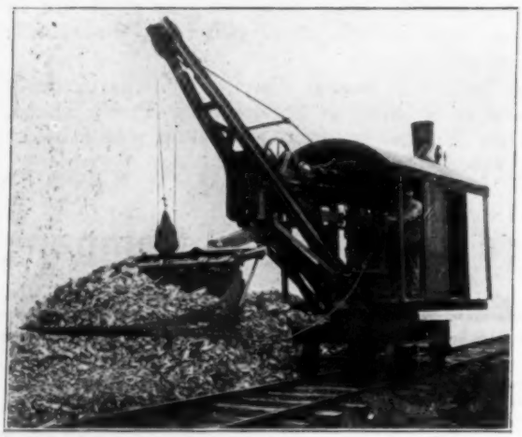

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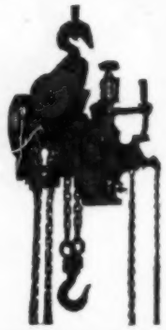

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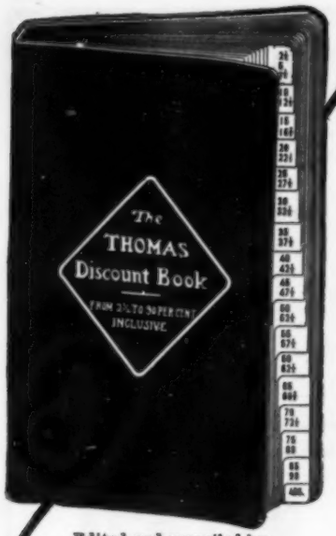

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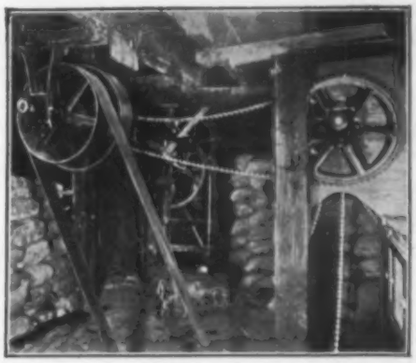

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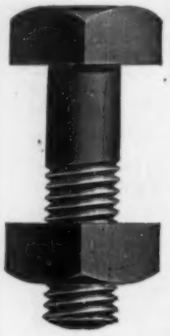

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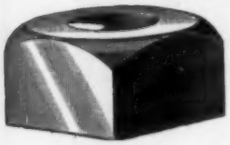

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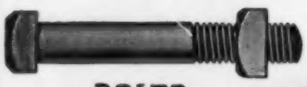

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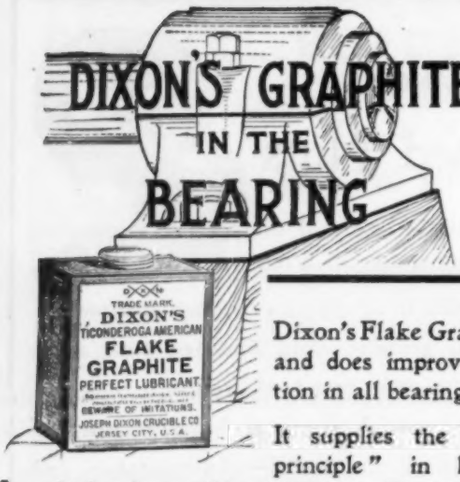

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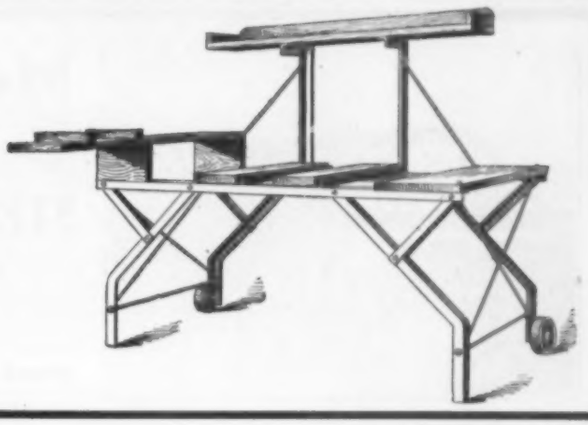

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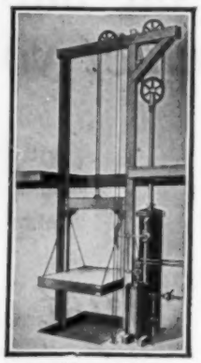

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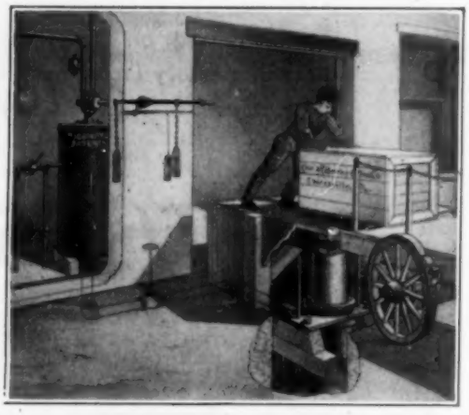

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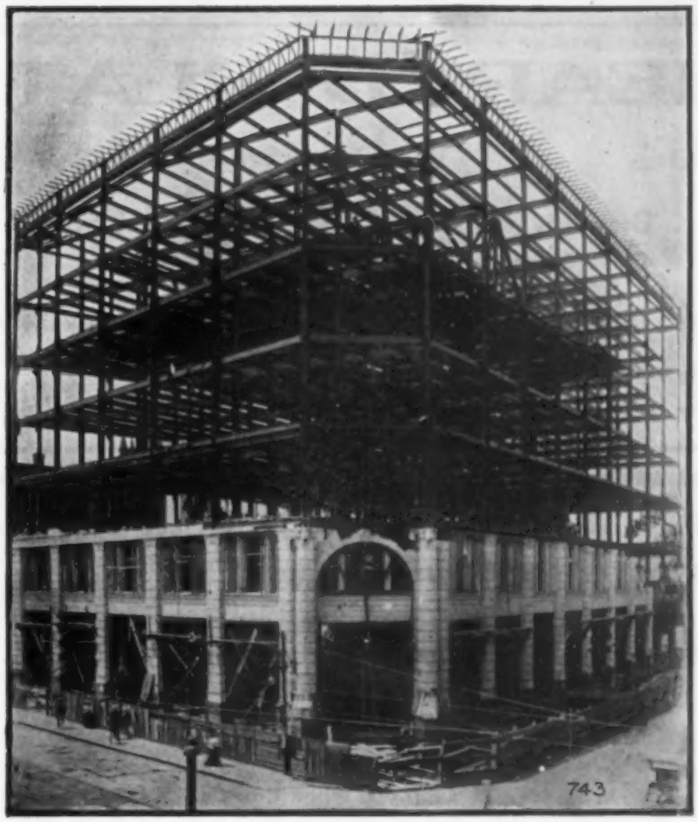

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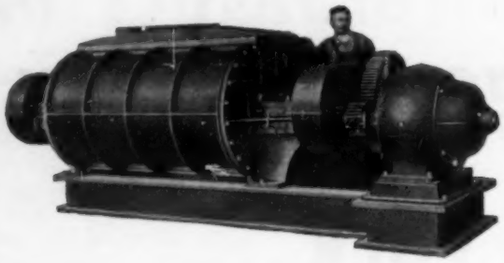

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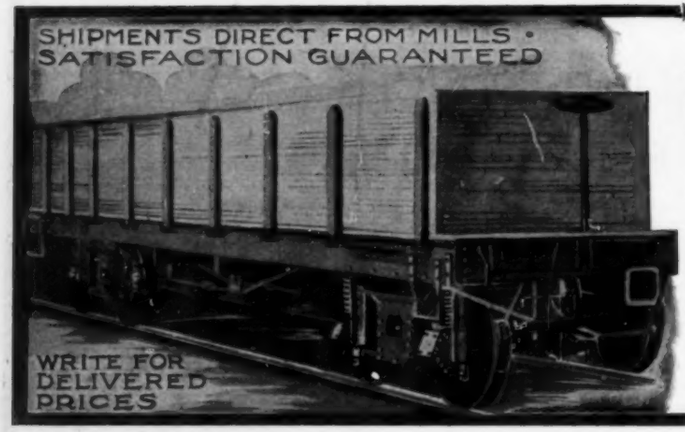

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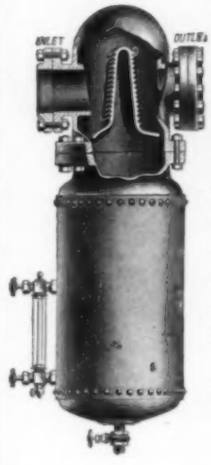

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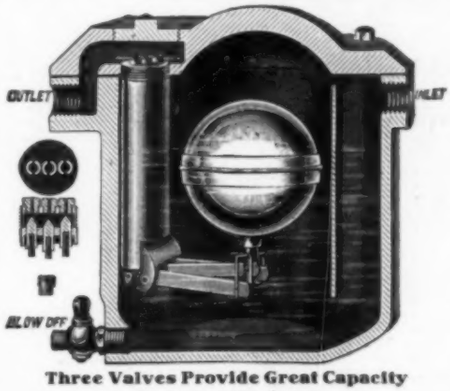

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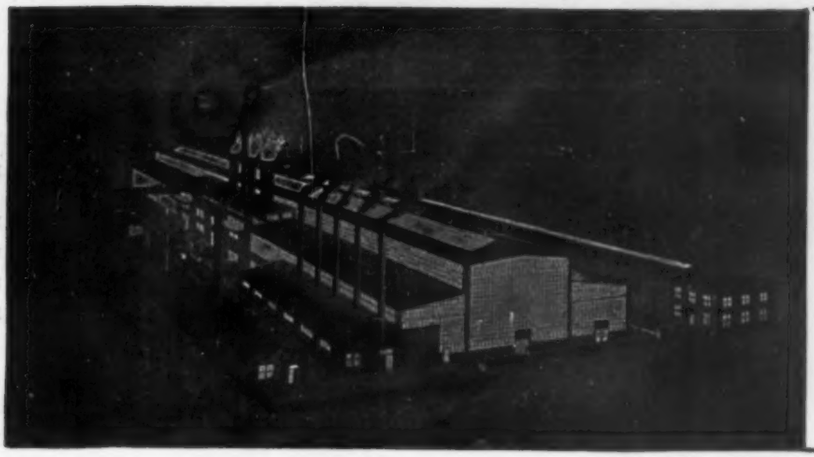

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Elliott, Debevoise & Anderson, New York.
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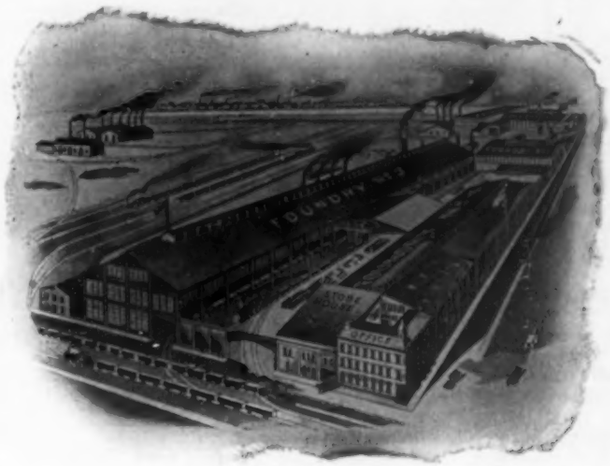

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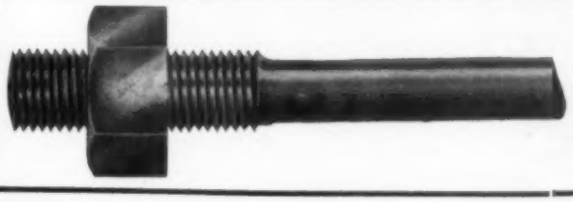

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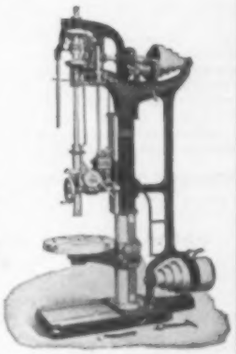

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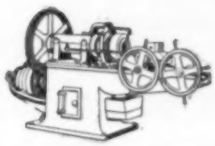

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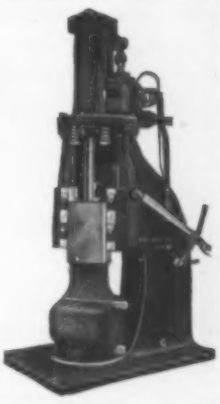

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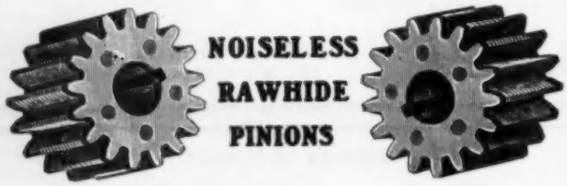

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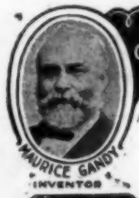

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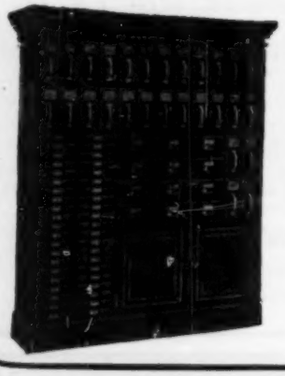

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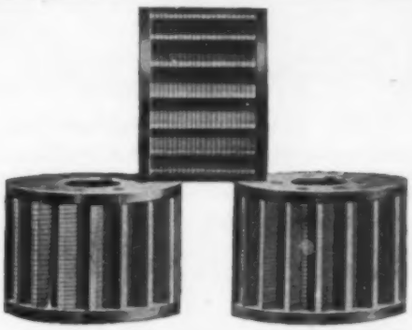

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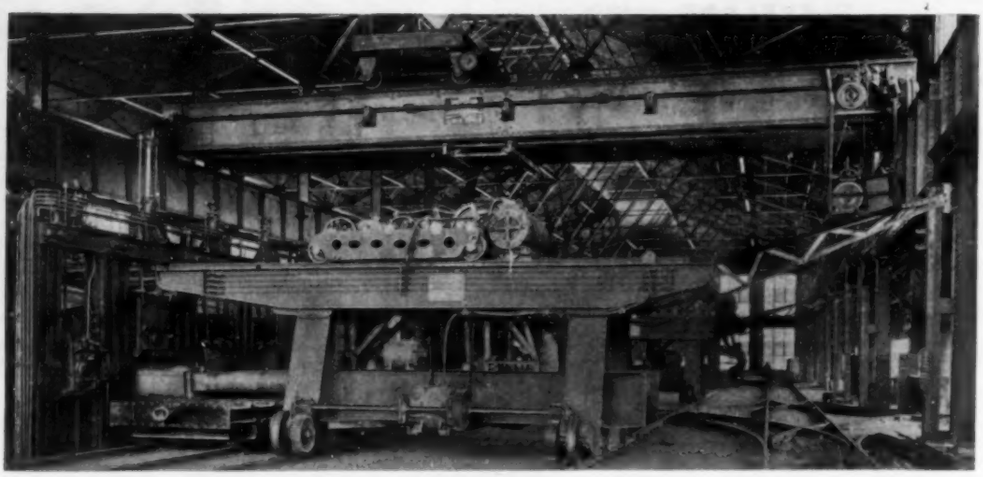

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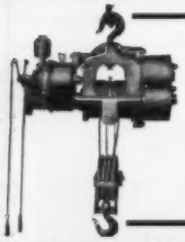

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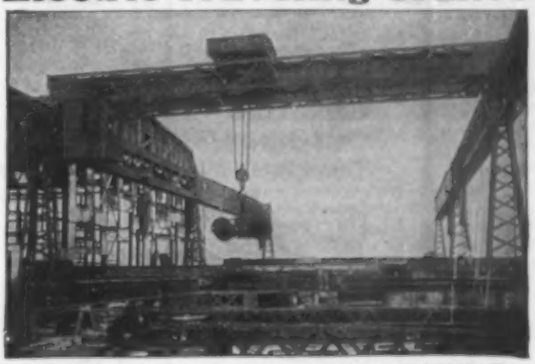

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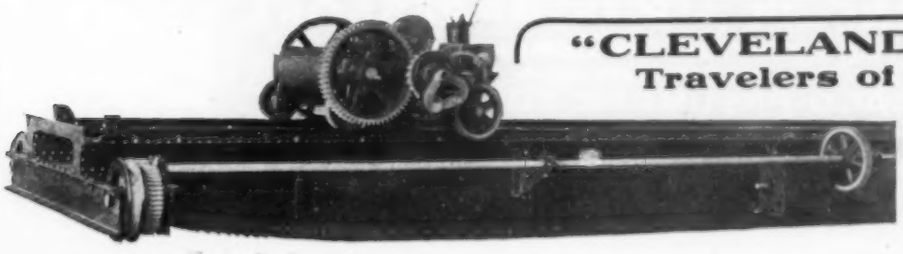

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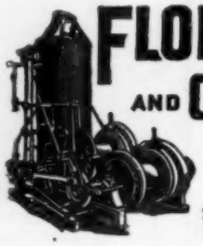

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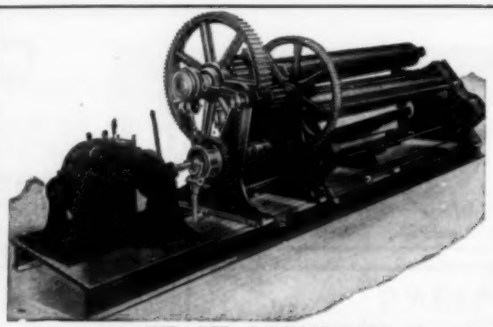

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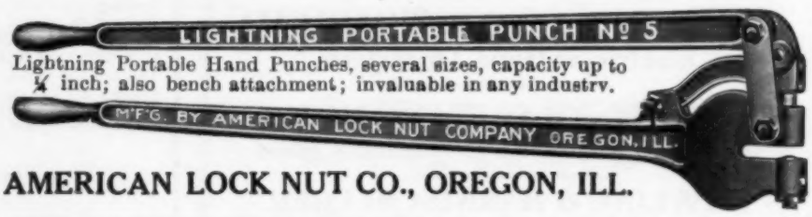

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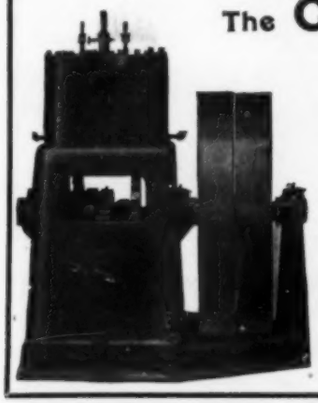

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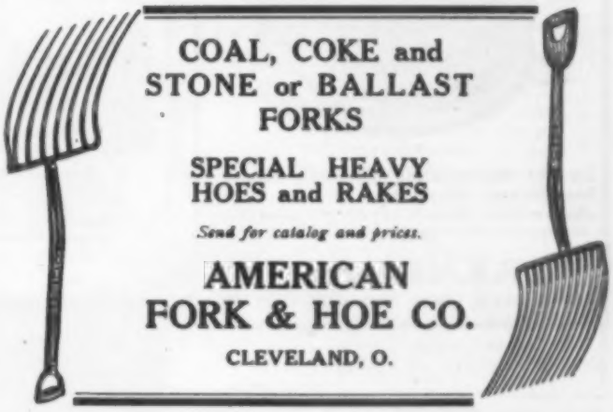

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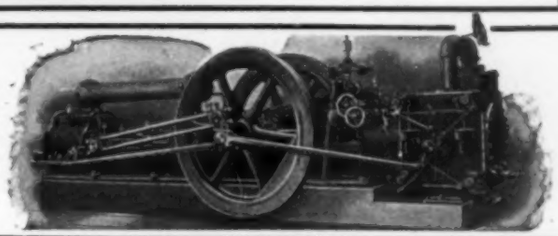

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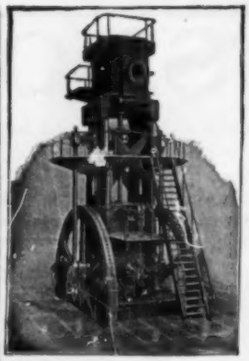

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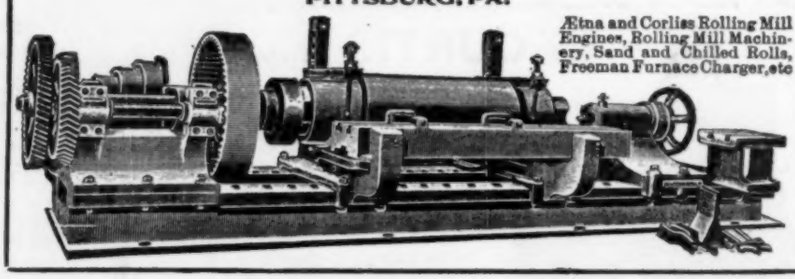

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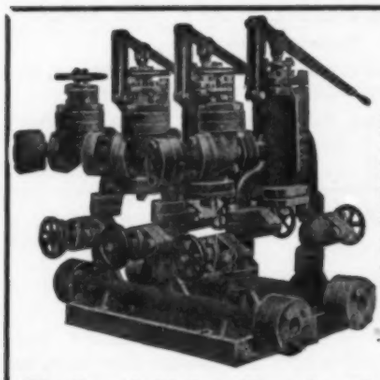

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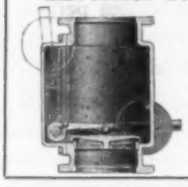

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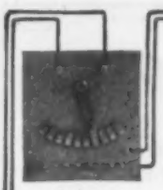

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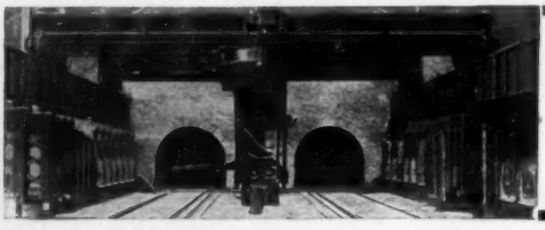

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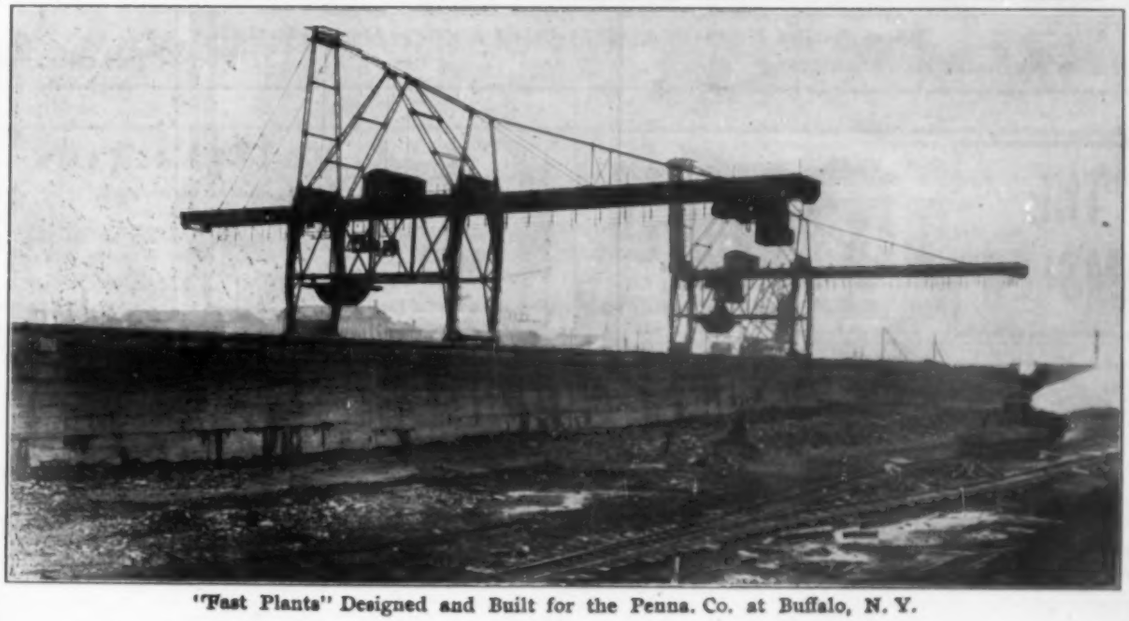

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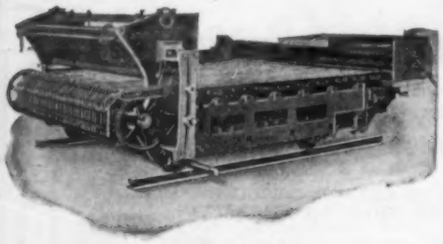

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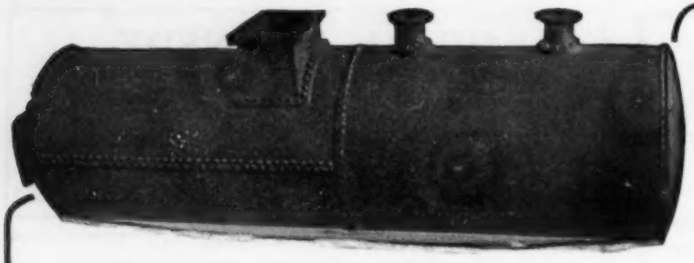

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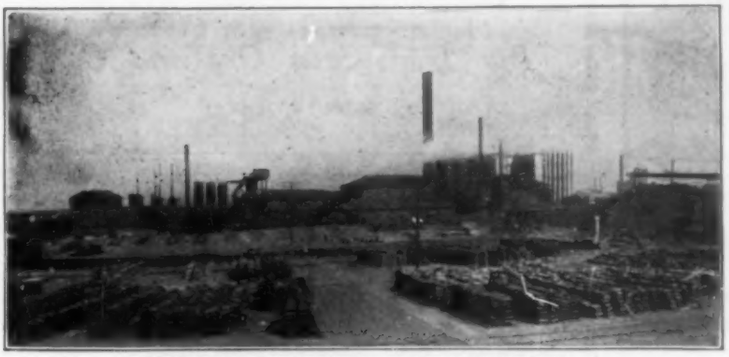

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About Our Buyers' Directory.

It has been compiled for the express benefit of our readers, and comprises over 280 headings under which are listed nearly 400 of the most prominent manufacturers of, and dealers in the different kinds of Iron and Steel, Castings, Foundry Supplies and Equipment, Machinery, Machine Tools, Hoisting and Conveying Appliances, etc. Whenever in need of anything in their line you will be consulting your best interests by writing the parties whose names appear under the various commodities listed therein. The Buyers' Directory immediately follows the Index in the back part of each issue.

THE IRON TRADE REVIEW.

RECEIVER'S SALE.

Valuable Foundry and Machine Plant.

By virtue of an order issued out of the Court of Common Pleas of Westmoreland County, Pa., there will be exposed to public sale on Friday, July 26, A. D. 1907, at 2 o'clock P. M., on the premises by the Receiver of the West Penn Foundry & Machine Co., the manufacturing plant of said Company located in the Borough of Avonmore, Westmoreland County, Pennsylvania, consisting of (10) ten acres of land, on which is erected a foundry, pattern shop, machine shop, brass foundry, and other buildings, which, together with fixtures, machinery and equipments, therein, comprise and constitute said plant; said plant is a large and extensive one and in good working condition and is a highly desirable plant with good railroad facilities. Terms made known on day of sale. For further information apply to

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2536—1½″ Acme Bolt Cutter.
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P. 3, Ferracute.
No. 1, Clifford Inclinable.
No. 2, Bliss, Stiles.
No. 2, Cross Speirs, Sliding Table.
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No. 4, Garvin, Plain.
No. 1 Bench Miller.

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24″ x 12′ Draper, C. R.
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42″ x 42″ x 18′ Fitchburg, 1 head.
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30″ x 9″ x 12′ Bement Frog and Switch, 4 heads.
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(1) 36″ Bickford Radial.
(1) 36″ Bement Miles.
(1) 6′ Ridgway Motor Driven Radial.
(1) 12-spindle multiple.

HAMMERS.

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(1) 36″ x 16′ H. C. Fish, B. G.
(1) 36″ x 20′ American Triple Geared.
(1) 26″ Lodge & Davis Pulley lathe.
(1) 45″ x 20′ New Haven Triple geared, raising blocks to 51″.

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(1) No. 4 Brown & Sharpe plain.
(1) No. 4 Cincinnati plain.

PLANERS.

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(1) 22″ x 22″ x 4′ Powell.
(1) 58″ x 48″ x 16′ National, 1 head.
(1) 72″ x 60″ x 26′ Fitchburg, four heads.
(1) 30″ x 30″ x 8′ Flather, 2 heads.
(1) 42″ x 42″ x 12′ Pond, 2 heads.
(1) 26″ x 26″ x 10′ Powell, 2 heads.

SHAPERS.

(1) 20″ Gould & Eberhardt.
(1) 24″ Walcott Shifting Belt.
(3) 24″ Gould & Eberhardt
(2) 28″ Hendey.

MISCELLANEOUS.

(1) 24″ American Turret Lathe.
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28 x 25 Fitchburg, compound rest.
30 x 18 New Haven compound rest.
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24" Niles Worm Gear Driven Slotter.

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16" Steptoe.
16" Smith & Mills.
24" Flather revolving table, power feed to head.
24" Walcott.
24" Walters.
24" Hendey Friction.
26" Cincinnati Geared Shifting Belt.
Fellows Gear Shaper.
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MISCELLANEOUS

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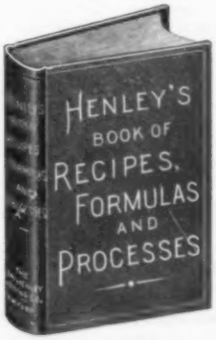

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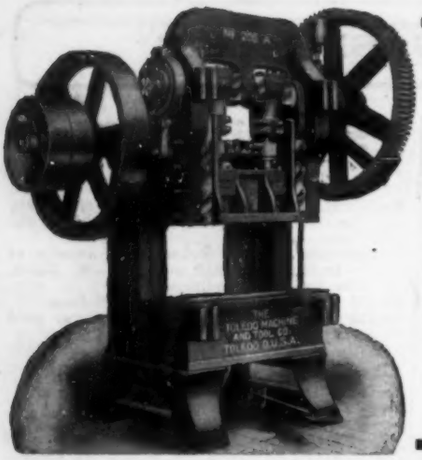

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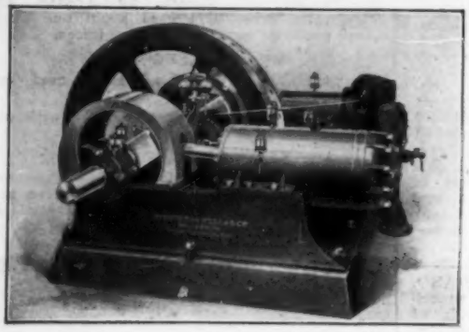

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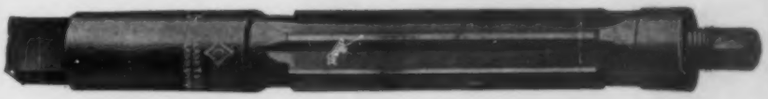

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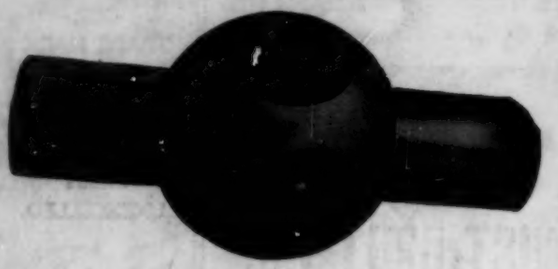

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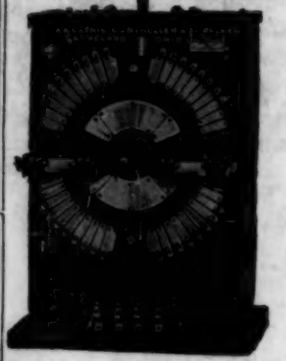

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